THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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New York, Thursday, January 12, 1905.

Direct Casting from the Blast Furnace.

The Methods of Production of Cast Iron Tunnel Segments as Pursued at the Works of Thomas Butlin & Co., Limited, Wellingborough, Northamptonshire, England.

Northamptonshire, geographically, is the most southern district of England where iron founding is in operation, and the ironmasters of that locality have long looked upon the metropolis as a most desirable market, seeing that a distance of only 60 miles separates them from London. In view, however, of the fact that until recently the output has consisted mainly of pig iron their aspirations in regard to London were not capable of realization; indeed, South Staffordshire was practically the only outlet for their production, in which district it is principally used in the manufacture of wrought iron, although some portion of the pig output was distributed to the foundries and forges of the Midlands, where it was remelted and worked into the manufactured article. It is perhaps the increasing use of soft basic steel, produced at a lower cost than Staffordshire wrought iron, which has diminished the use and consumption of Northamptonshire pig iron.

One may also couple with this circumstance the recognition of the fact that a modern tendency in manufacture is to eliminate intermediate processes while bringing the source of production as near as possible to the district in which the finished article finds a market.

Thomas Butlin & Co., Limited, of Wellingborough, a firm established in 1852 and accredited the first to smelt Northamptonshire iron, determined upon an exhaustive series of experiments with a view to making castings direct from the blast furnace from their local ores, and so take advantage not only of the closer proximity of their works to London, but in addition effecting the economy of not being compelled to import foreign ores from other districts. As the result of previous experiments made by this firm in respect to valves, valve seatings, car wheels, &c., for their own use, and their suitability having been demonstrated, they have now entered upon the process of direct castings upon a manufacturing scale.

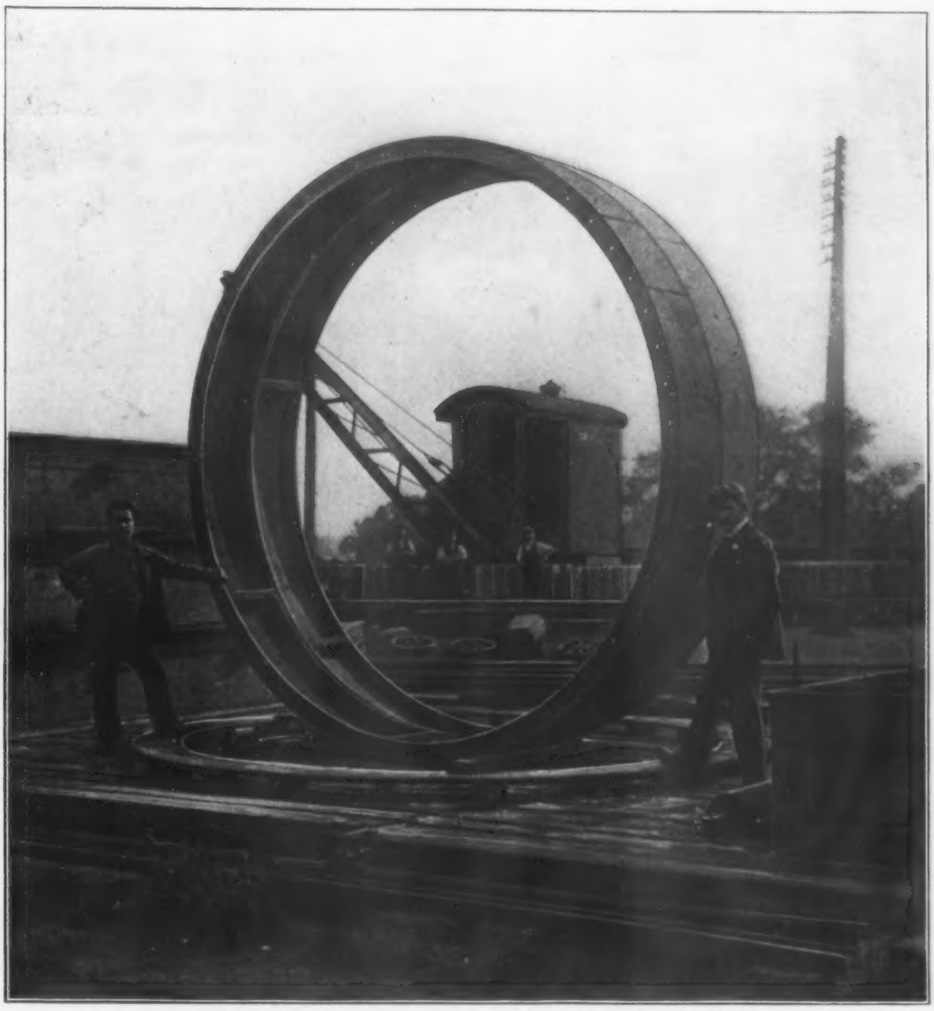


Fig. 1.—Two of the Finished Rings, 11 Feet in Diameter, as Used in the Great Northern & Strand Tunnel Railway of London. —Made of Segments Cast Direct from the Blast Furnace and Bolted Together After Having Their Ends Milled.

The Direct Casting of Tunnel Segments.

A suggestion of the success obtained is afforded by the fact that this firm has now completed a contract of 5000 tons of tunnel segments, delivered at the rate of about 100 tons weekly, 90 per cent. of which were made direct from blast furnace metal without the intervention of the cupola. These were for the Great Northern & Strand Tunnel Railway, together with special castings for the King's Cross and Piccadilly Line. As recently as June last this important development in the Northamptonshire iron ore district was celebrated under the presidency of Lord Lilford by the opening at the Irthlingborough Iron Works, Wellingborough, of a new foundry under the auspices of Thomas Butlin & Co., Limited, and the closely allied Northamptonshire Direct Castings Company, Limited.

The idea of casting direct from the blast furnace is naturally not new in metallurgy, but, owing to the desired result and composition of pig metal, which is, in effect, carefully mixing the ores in the manufacture of pig, instead of the more usual practice of mixing different grades of iron in the cupola.

The Northamptonshire iron ore obtained from the inferior oolite may be described chemically as a brown hydrated sesquioxide of iron, containing about 6 to 7 per cent. of water of combination, in addition to its hygroscopic mixture. The average yield of the raw ores in bulk is from 34 to 37 per cent. of metallic iron, but a certain proportion of calcined ore is used to augment the yield.

As good iron is the concomitant of good slag, the quality of the slag was regarded during the experiments as an index to the character of the iron obtained from it. A typical slag was made which should contain about 15 per cent. of alumina, 32 to 33 per cent. of silica and 40 to 43 per cent. of lime. The result was a combination

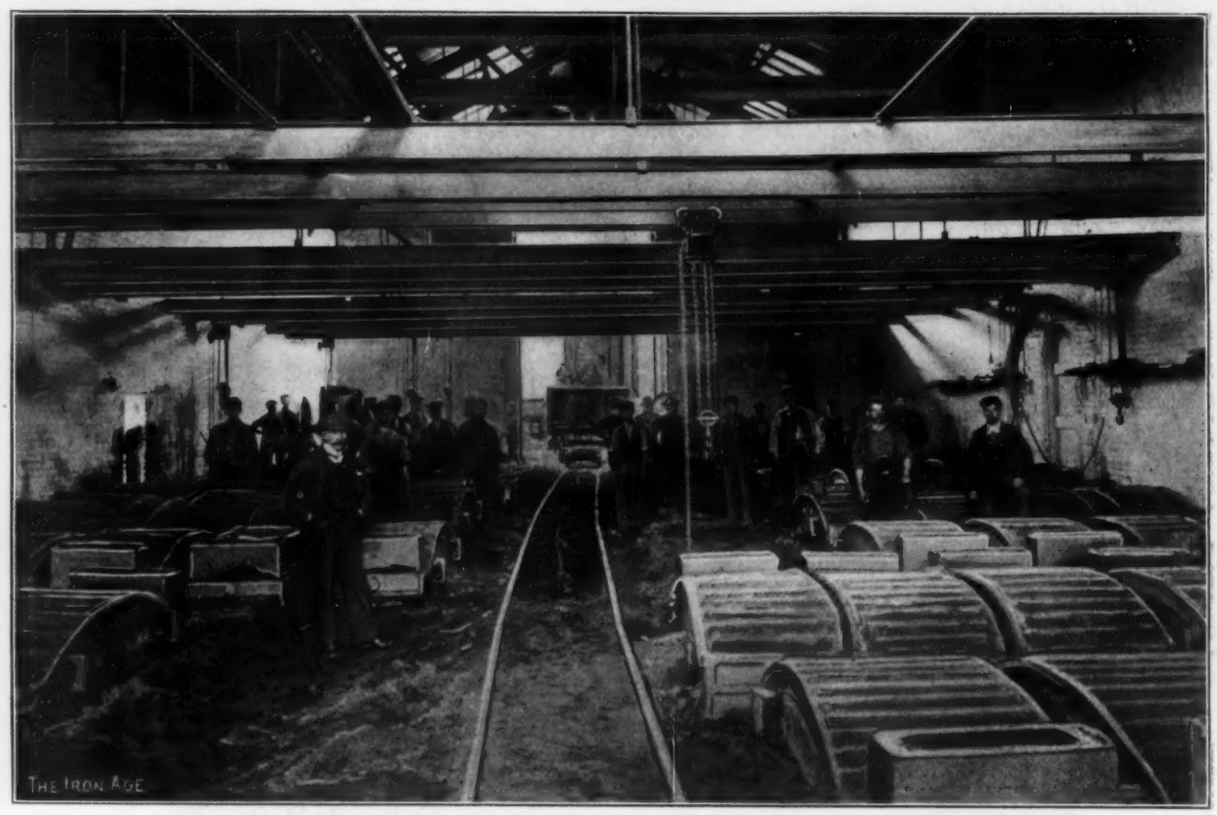


Fig. 2.—Interior View of the Segment Foundry, Showing the Arrangement of the Molds and the Traveling Hand Hoists Used in Manipulating the Molds and the Pouring Ladles.—The Metal is Brought from the Blast Furnace in Ladles Carried by a Locomotive Crane.

mand for complicated castings, in which exact requirements involving remelting in the cupola have to be met, as well as to the circumstance of the lack of uniformity in the metal thus produced, this practice has not been much followed, except for rough castings for works purposes or for very cheap shapes of cast iron goods. As the efforts made in the latter direction have not in all cases been successful, the means adopted at Messrs. Butlin's works are of considerable interest. The success has been attained not so much by mechanical means as by a careful study of the chemistry of the subject by W. H. Butlin, the chairman and managing director of the firm, with the ready assistance of W. Wright, the foundry manager.

Selection of Ores to Produce Desired Castings.

Recognizing the fact that suitable chemical combinations in the blast furnace are not only attended with economy of fuel but result in an improved quality in the process of manufacture, and taking advantage of the variability of the iron ores of the district, which would otherwise be detrimental to quality, Mr. Butlin selects the ores according to their chemical composition and then unites them in the proportions necessary to produce fusible at a comparatively low temperature. The blast used preferably ranged about 900 degrees F., the object being to obtain the action of stronger reducing gases in the blast furnaces. Again, special care was taken in the selection of the limestone to insure as far as possible that it will be porous and that it will thus flux more readily and facilitate the admittance of graphitic carbon into the iron.

The Coke.

Another important element in success has reference to the quality and purity of the coke used, so as to insure that it will contain 90 per cent. by weight of carbon, and not more than 7 to 8 per cent. of ash being preferable. A rough commercial test, which Mr. Butlin has introduced into the practice, is what he terms a gravimetric test, which depends upon the low specific gravity of carbon in relation to that of the ash contained in a fuel. The practice is to weigh the coke in boxes of a cubic yard capacity after it has been broken into cubes about the size of a walnut, and if the weight of this exceeds that of a given standard, suggestive of a larger proportion of ash than is desirable, the coke is subsequently analyzed. The usual float test is also applied.

The care taken in the selection of the iron ore, limestone and fuel obviates a higher temperature in the blast furnaces than would otherwise be necessary, and under proper conditions gives a sound and solid casting. The fuel consumption, about two-thirds coke and one-third Yorkshire coal, is at the rate of 2520 pounds per gross ton (calculated as a coke equivalent), and the make, principally foundry iron, has the following constituents:

	Per cent.
Graphitic carbon	2.85
Silicon	1.92
Sulphur	0.10
Manganese	0.24
Phosphorus	0.89 to 1.19

Owing to the exact and suitable chemical composition of the slag, and the fact that the district is deficient in hard rocks suitable for road making, the iron works are in the position of being able to dispense with slag tips, disposing of the whole at a fair profit. The slag as it runs from the furnaces is molded into rectangular blocks, weighing about 1450 pounds, in side tipping cast iron cars, which chill rapidly. The blocks when cool are roughly broken by hand and passed through stone breakers with drum sizing sieves, which reduces the bulk up to road metal or railroad ballast size. The finer chippings are finding a use as ballast in making granolithic slabs, and a considerable quantity has also been used in decorative molded work of the North British Hotel at the Waverley station in Edinburgh.

The Methods of Production.

The equipment of the foundry, though simple, is nevertheless very efficient. The casting channels have been extended beyond the pig beds of the furnaces to the side of a sunk pit containing the receiving ladles, which vary in capacity from 3½ to 5 tons, and are taken away by a locomotive crane running on rails to the segment foundry. This is a rectangular building of 45 x 100 feet, open at the ends, with a railroad running down the middle separating the floor space for the molds, as shown in Fig. 2. The ladles are manipulated by means of differential pulley block hoists mounted on trolleys running on overhead joists. The tunnel segments and other special castings are made in the foundry with ordinary sand.

The specified test for the metal is a load of 28 cwt. (3136 pounds) on a bar 3 feet 6 inches long by 2 x 1 inch, set 3 feet between centers. The segments weigh about 560 pounds, being 6 feet 7 inches long and 20 inches wide, with plate ⅞ inch thick and flange 1⅛ inches thick, and are formed with 4¾-inch flanges on all four sides, so that they can be bolted together to make a complete ring 11 feet in diameter. The flanges, in accordance with the general practice, are on the inside, forming ribs to resist exterior compression. The ends of each segment are milled so as to insure a good bedding and to make the circle absolutely true. This milling work (see Fig. 3) is done on special tools made by Messrs. Kendall of Manchester, having beds curved to the shape of the finished ring, upon which the segment is secured by bars passed through the end bolt holes, and both flanges are milled simultaneously by means of milling heads having inserted cutters. Whitworth steel is used for the cutters, and the segments, which are 20 inches wide, are milled in about seven minutes, excluding the time taken for fixing. The finished segments are removed from the milling machines by the crane and deposited on a pair of rail bearers, beneath which is a coal fire which heats them up to the temperature required for receiving the protecting bituminous coating. Thus, in the completion of the segments, as well as in the intermediate stages, economy of manufacture is insured, and we understand that the contract price is considerably less than that formerly found necessary.

Fig. 3.—Interior View of the Machine Shop, Where the Ends of the Segments Are Finished Smooth by Means of the Double Head, Curved Bed Milling Machines Shown.—Both Ends Are Machined Simultaneously.—A Segment is Placed in Machine and Finished in Seven Minutes.

Theory of the Process.

In reaching the standard of the foregoing results Mr. Butlin has started on the hypothesis that iron is iron pure and simple, and that the resulting quality of the pig

metal is principally due to the nature and relative proportions of the metalloids associated with it in its treatment in the blast furnace, and is strongly of opinion that quality and quantity are together incompatible to the ends in view in either case. It is further assumed that a strong producing action is necessary in the blast furnace where the best quality obtainable is sought after. Of the metalloids which play a more important part both carbon and silicon take a high place, from the fact that graphitic carbon within certain known limits promotes fluidity and softens the product, while silicon is equally useful in converting some of the combined carbon of the carbide of iron into graphite, thus preventing the hardening which might result from any excess of carbon in its combined form.

It is also essential that sulphur should exist only within the smallest limits possible, and no better course insures this than to attend to the purity of the fuels used.

With regard to phosphorus, it is not objectionable for a great number of castings where clear definition and fluidity are an advantage so long as it does not occur in sufficient quantity to impair their strength and breaking strain.

These points are mentioned by Mr. Butlin as broadly suggestive of the lines upon which further investigation may be advantageously pursued. There are at this stage hopeful aspirations that in the future it may be possible so to unite theory with practice as to formulate the chemical compositions of the direct metal which is required as well as to become fully acquainted with the conditions under which these are obtained in the blast furnace. A reasonable assurance of the production of the kind of metal desired means nothing short of the perfection of a process which not only tends toward economy simultaneously with quality but bids fair to have extensive use in the near future.

Profits in Iron.

The following *morceau* from a Philadelphia newspaper will be enjoyed by many of our readers:

Joseph Wharton, the iron and steel manufacturer, recently addressed the Wharton School students at the University of Pennsylvania on the iron industry. Afterward it was announced that he was ready to answer any questions which the students might wish to ask with regard to the iron business.

One of the students, who was evidently considering the possibilities of iron, arose at once and asked: "Mr. Wharton, will you tell us what the difference is between the cost of preparing the iron for sale and its market value?"

"Well," said the iron magnate, after a pause, "our profits are difficult to estimate. You must add the cost of skilled labor in the preparation to the primary cost of getting the ore out of the mines, and then there are almost endless incidentals. And then, too, the markets change, so that this further increases the difficulty."

And the student is still calculating the profits in iron.

The Creditors' Committee of the C. Aultman Company, Canton, Ohio, and allied corporations has submitted a plan for liquidation. It is proposed that the committee acquire at such price and in such manner as it may deem for the best interest of the creditors of the several companies who shall deposit their claims with it, such portion of the assets of the Aultman Company of Ohio, the Arctic Machine Company of Ohio, the Cedar Rapids Supply Company of Delaware, doing business at Cedar Rapids, Iowa; the Western Supply Company of Illinois, the Kenyon-Rosing Machinery Company of Minnesota and the E. T. Kenny Company of Indiana, as may be offered for sale by receivers or trustees in bankruptcy of those estates, or otherwise, at prices the committee may deem advantageous for the benefit of depositing creditors. The net proceeds realized are to be distributed pro rata among the creditors.

The United Verde Copper Mine.

BY DWIGHT E. WOODBRIDGE.

Doubtless more misinformation has been given the public as to the United Verde copper mine than the most discredited promoter ever unloaded regarding his specialties. The unchanging policy of deep secrecy pursued by Senator William A. Clark, owner of nearly all the United Verde stock; the glamour that hangs about a success and the inaccessibility of the mine, far from the beaten paths of travel, all contribute to this lack of accurate knowledge. That it is a great mine, earning millions each year, there is no doubt, but it is surely many times removed from the truth to claim that the owner has been offered the immense sums he is said to have refused, and its annual production of both copper and precious metals has been grossly overstated.

Location and Geological Features.

The United Verde lies at Jerome, on the eastern slope of the Black Hills range, in central Arizona, a little more than a mile above sea level. As the traveler climbs the range and descends its eastern side a belt of diorite is crossed that strikes north and south, and it is in slates in contact with this diorite that ores are found. These slates stand nearly vertical, and the diorite, as it approaches the contact, appears to have a corresponding stratification. This belt traverses the country 30 miles, from the United Verde to the crest of the Bradshaw Mountains, and the slate varies in width from 1800 feet to several miles. There is a quartzite foot wall, a diorite hanging, and, wherever ore appears, cross dikes and sills of the latter rock are found branching out from the main wall and cutting across the slates and their replacement ores almost at right angles to their strike. Several mines are located upon this belt, but none other than the United Verde has proved of great value. The region has been prolific of stock certificate mines, into which the money of Eastern investors has been freely poured. The proximity of a single mine like the United Verde, with an unusual name and a reputation for fabulous wealth, is accountable for not a little of this.

The surface croppings at Jerome were very decomposed, highly leached, quartz iron gossan. The ore body consisted of oxide and sulphide zones. The former have been worked out, and were not of great importance; the latter are now being mined. In the zone of secondary enrichment the dissolved copper has been reprecipitated in the upper portion of the sulphide zone, and here the ore is mainly argentiferous chalcocite, with some other alteration minerals. There is a very complete replacement of the slates by ore. Beneath, the unaltered ores are largely chalcopyrite and some bornite, carrying both gold and silver in considerable values.

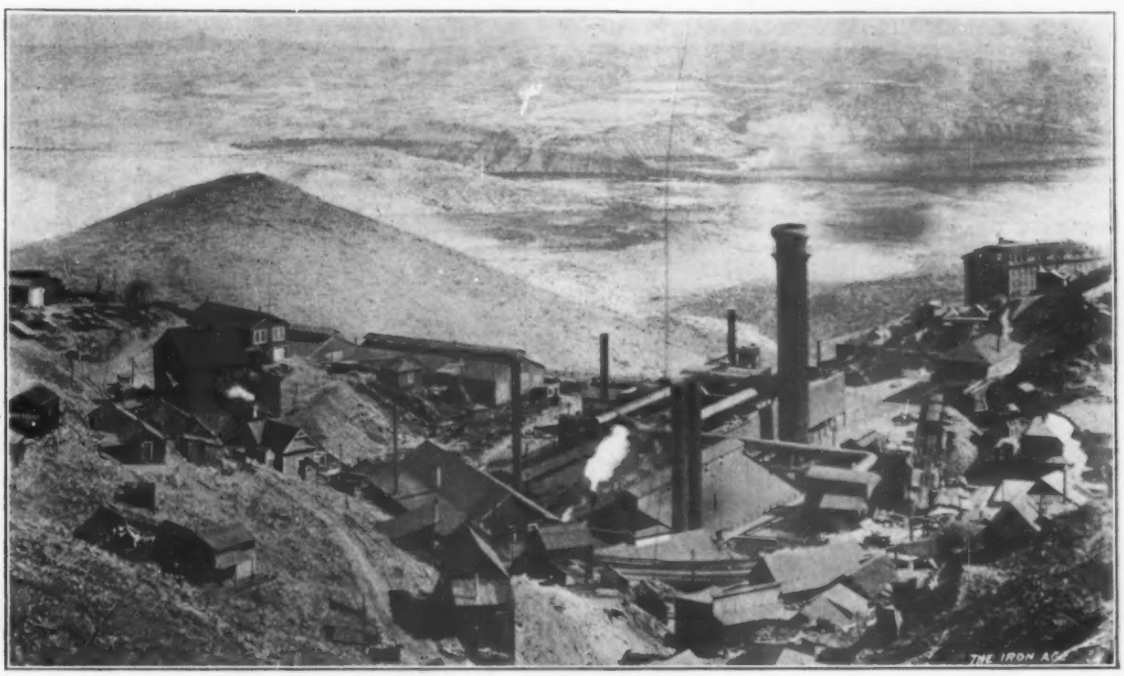
Description of the Property.

In 1888 the mine was purchased by Senator Clark for somewhere near $35,000. It had been a small silver-gold producer, its values consisting largely of free milling ores contained in the oxidized zone on the side of the mountain and above the present mine. It is opened on a great lens of rich sulphide ores, and its ore body is said to be about 900 x 1400 feet in dimensions and of unknown vertical extent. It has been drilled to the depth of 2000 feet, with values, perhaps, fairly well maintained to the bottom of these holes. It is opened to the 800-foot level, but most of its mining is carried on above. In the area opened all ore is rich enough to smelt, and no concentration is attempted. There are two incline shafts, only one of which is now in operation, the other undergoing repairs. On account of insufficient timbering in the past the mountain is moving, although slowly, and these openings give considerable trouble by drawing.

The main shaft has three compartments and loads of three tons are hoisted. It comes up under the smelter, and ore is trammed direct from its bins to the furnaces. A large portion of the ore mined is roasted, and this is drawn out of the mine through a tunnel, spread out in heaps wherever there is flat ground enough for making them, trammed back into the mine, and hoisted to the

smelter. Of course this process entails considerable unnecessary labor and increases costs, but the layout was so planned as to require it. The mine is worked pillar and stall, and worked out stopes are filled with loose rock milled down from the surface through raises. Timbering is square set, and no more is used than is considered absolutely necessary, on account of the heavy cost of getting it in. It is said that a quantity of ore containing values of about $15,000,000 in copper alone, at the present price of the metal, is required to sustain the smelter buildings, but this is the merest current gossip.

Men who know say that the interdiction of outsiders from the mine is unnecessary, so far as any idea if its magnitude may be concerned, as very little could be learned from a casual inspection on account of the maze-like and irregular character of the older openings. But it is not considered an especially pleasant or safe place to enter. These Jerome sulphides are especially liable to spontaneous combustion, and the mine has been on fire for many years. The friction of moving masses of the mountain has generated intense heat. At this time a considerable area of the best ores in the mine is bulkheaded off on account of fire. In 1902 the fire grew so serious that the mine was closed and sufficient carbon dioxide was permitted to flow down the shaft to fill the workings and kill combustion for the time being. This fire, which has been burning underground for seven or eight years, is slowly eating its way through the mine. Attempts to quench it by water are, of course, impossible, not only on account of the scarcity of that liquid and of the fractured character of the rocks inclosing the ore, but from the chemical action of the sulphides themselves, once thoroughly dampened. It is, therefore, a condition that will probably be permanent so long as there are ores rich enough in sulphur to provide fuel. Because of these fires, by reason of the heat of ordinary sulphide openings, of acidulated waters, of the drawing of shafts, of caving ground, and for other reasons, the mine is not considered a desirable place for work.



United Verde Smelter, Jerome, Ariz.

The Smelting Plant.

Treatment is by smelting in rectangular water jacket blast furnaces, making a 50 per cent. matte, blown up to blister copper, with a portion of the ore roasted to eliminate the sulphur prior to smelting. The coke consumption is claimed to be exceptionally low, and 5 per cent. is officially given as the figure in regular charges. Ore for the roast heaps is trammed electrically through a 1300-foot tunnel from the 500 level to the side of the mountain, heap roasted with a small amount of wood and taken back as stated above. Somewhere near 25 per cent. of the charge is this roasted ore, and a part of the remainder is oxidized material from open surface cuts, that carries not over 1 per cent. copper, but runs up well in precious metals.

At the time of my visit about 800 tons of copper ore were smelted daily, and the product was 50 tons of Bessemerized. The smelter contains 500-ton stacks, but these seem to be considered extravagantly large and the new stacks going in are smaller. When present improvements are completed the plant will consist of six stacks, with a capacity for nearly 1800 tons a day. Recently dust chambers have been added, and the flue dust, copper sulphate from precipitated waters, and some ore are briquetted and used in the charge. The smelter is situated on a level piece of ground on top of the mine, and the slag is carried a few feet away and dropped over the side of a precipice not far from 100 feet high. An illustration of the smelter is herewith given.

The Surroundings.

The little town of Jerome is supported entirely by these works, and hangs by its eyebrows to the steep side of the mountain forming the west wall of the Verde River valley. These hills rise 3000 or 4000 feet above the valley and the mine is about half way up. As one looks off across the Verde and to the cliffs on the farther side, or as, coming into Jerome, he suddenly rounds some projecting scarp that has hidden them from sight, the view that bursts upon his gaze is entrancing. It is another Grand Canyon of the Colorado, with its brilliantly painted white and crimson sandstones, its castellated battlements, its towers and cathedrals, its purple distances, its brown and drab foreground, its green patches thrown down by the riverside, where some enterprising Mormon may be irrigating a ranch the size of a pocket handkerchief, and its river winding slowly through the distance to join the laboring Gila; it is all a scene that can never grow less beautiful nor ever be forgotten. But Jerome cares little for view. A camp more utterly forlorn, more destitute for the majority of its workers of that which tends to make life pleasant, is hard to conceive. Butte, on its bare granite rocks, its sulphur smitten hilltop, where is neither blade of grass nor spear of living thing, and Deadwood, in its deep canyon, with house lights twinkling far toward the zenith and with its cyanide polluted streams, are uninviting enough; Jerome, with sulphur fumes ingulfing and burying habita-

tions that, but for a more or less pretentious row occupied by superintendents, are better hidden than in sight, and with its narrow, steep, unpaved hillside streets, foot-deep in dust, is a still less pleasing object. Commanding the village and surmounting an outthrust abutment of the mountain stands the imposing Montana, a hotel built by Senator Clark for the accommodation of his employees.

In addition to his United Verde Senator Clark operates the Equator mine. Adjoining it is the Copper Chief, an idle property, owned in Connecticut. These, though but 6 miles away in a direct line, are about 15 miles by wagon road. At the Equator is a matte smelter treating 150 tons of rich ore, which is the daily product. Coke and supplies for this mine and smelter are hauled 15 miles by teams of 8 or 10 mules, and the matte is dragged back and blown up at the Jerome smelter. Ore from the Equator is delivered at its smelter over a rope tramway, and on account of high costs nothing but ores carrying a high percentage of copper and considerable precious metals can be treated at a profit.

Connecting Jerome with the outside world, as represented by the Santa Fé, Prescott & Phœnix road, is a narrow gauge line 28 miles long, which is one of the interesting features of the situation. If it ever happens that the cowcatcher of a locomotive can collide with the rear end of the last coach, this road will give amplest opportunity. There is place after place where the road turns almost at a right angle. The character of the engineering done along this line can be judged from the fact that there is but one through rock cut worth speaking of on the entire road, and this though it swings in and out around and over the jagged mountains of rock for more than 14 miles. An extension of this road to the Equator has been surveyed and may be built in due time. All mine timber and supplies, all smelter coke, &c., are brought in over this road, and there are piles of coke at the junction point sufficient to run the plant four to six months.

The Output and Its Cost.

The United Verde in 1899 produced 43,995,000 pounds of copper. In the following year dividends of $4,498,680 were paid. This was the highest record ever made by the mine, and that was a period of 16 to 18 cent copper. Now it is making 100,000 pounds daily, which is to be increased when the smelter capacity has been enlarged, the mine brought up to a corresponding output and when a more adequate water supply shall have been brought in. It has been stated that the cost of making copper at Jerome, deducting gold and silver values contained in the product, is from 3 to 4 cents a pound, and this approximates the net earnings record for a series of years.

The Heyburn Bill to Regulate Corporations.—Senator Heyburn of Idaho has introduced a bill proposing that Congress create a new department of the Government, to exist in connection with the Department of Commerce and Labor, to be known as the National Board of Corporations. This board shall consist of five persons, four to be nominated by the President and the fifth member shall be the Secretary of the Department of Commerce and Labor. The bill provides that the board shall have the power to compel the production of all books or documents, or the attendance of witnesses necessary to the investigation of any corporation. Under the provisions of the bill no corporation would be permitted to engage in business in any State other than that in which it is incorporated, unless satisfactory proof is first submitted to the National Board that it is incorporated for a legitimate purpose; that it is solvent; that it is not a party to any agreement to operate in restraint of trade or commerce; that it is not a party to any pooling plan which when carried into effect would create a monopoly of the trade or business; that no voting pool exists by which the full and free right to vote the stock of the corporation by the actual owner of such stock is abridged or prevented, and that no part of the capital stock of such corporation shall be owned, controlled or voted by any other corporation.

The Longest and Heaviest Cold Rolled Steel Band Ever Rolled.

A representative of *The Iron Age* had the pleasure of visiting the cold rolling plant of Henry Disston & Sons, Incorporated, Philadelphia, Pa., and witnessing the rolling of what is believed to be the longest and heaviest cold rolled steel band ever made. This band, an illustration of which is shown herewith, is 201 feet long, 15 inches wide, 0.134 inch thick, and weighs 1474 pounds. The cold rolling operation was done on the firm's 20-inch cold mill and by repeated passes reduced from 0.270 to 0.134 inch in thickness. This was accomplished on the regular outfit of the mill without making any special additions or arrangements for handling.

The finished condition of the band as to uniformity of thickness and perfection of surface could not be excelled. It was perfectly straight and flat, and the edges were parallel the entire length. Heretofore bands up to

The Longest and Heaviest Cold Rolled Steel Band Ever Rolled.

50 feet in length and 14 inches in width have been regularly made by Henry Disston & Sons on this cold mill, but this is the first time, as far as known, that the cold rolling of a band of such length and weight has been so successfully accomplished either in this country or abroad.

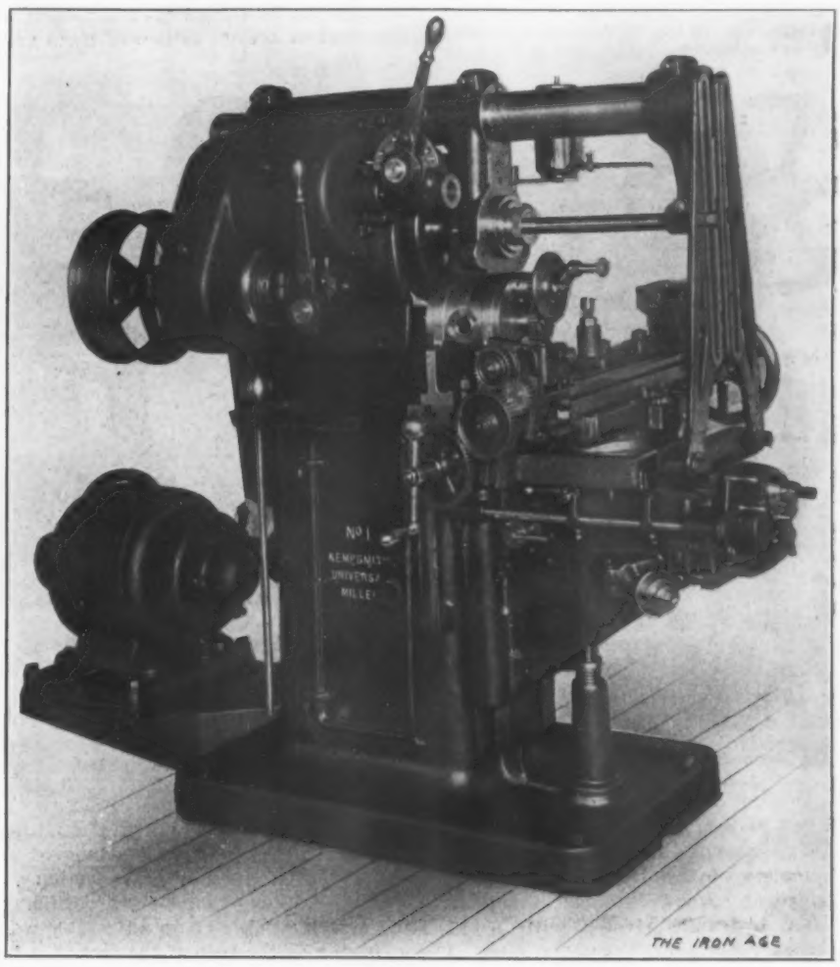
The production of the Baldwin Locomotive Works, Philadelphia, Pa., for 1904 was 1453 locomotives, of which 1352 were actuated by steam, 94 by electricity and 7 by compressed air. This is a reduction of nearly one-third from the number built in 1903, which was 2022. The locomotives exported aggregated 286, to the following countries: Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Guatemala, Hawaii, Japan, Korea, Mexico, New Zealand, Peru, Porto Rico and South Africa. The company reports a very much better condition of affairs for the coming year. Up to this time orders have been booked for a total of 350 locomotives for the Pennsylvania Railroad Company. These are both of the freight and passenger type, and are apportioned into 325 locomotives for the lines east of Pittsburgh and 25 for lines west of that city. The Missouri Pacific Railroad has placed an order for 50 locomotives, and the Cincinnati, Hamilton & Dayton an order for 30. A large number of orders have been booked for smaller quantities, both from railroads and individual concerns. The prospect for future business is very good, preparations are being made to operate the plant on a much more extensive scale than was the case during the last half of the past year.

The Kempsmith Universal Milling Machine.

An interesting arrangement of motor drive for a universal milling machine is illustrated herewith, being the product of the Kempsmith Mfg. Company, Milwaukee, Wis. A 1½ horse-power constant speed motor, with back gear attachment, is mounted on a bracket bolted to the rear of the pedestal of the machine. The back gear shaft of the motor is connected to the driving shaft of the machine by a wide faced belt or, if preferred, by a chain. The miller is provided with variable speed mechanism, giving a range of 16 changes obtained through ring frictions, a device which is of advantage in that it permits the combination for any desired speed being thrown in while the machine is running without interfering with its operation. The device is strong and of simple construction, and the various changes are obtained through levers located at the front of the machine within easy access of the operator. A speed plate attached to the machine shows the full range of speeds and how to obtain each. The mechanism is neatly incased and has ample facilities for oiling the working parts. The starting box is mounted above the machine, where it is out of the way, although the switch and starting box levers may be easily reached by the operator.

This arrangement for driving may be applied to the machine at any time after its completion, or it may be incorporated in the machine when it is built. The advantage of the latter is that the builders are able to devise a somewhat more compact construction. All feeds to the table are positive and automatic. The geared feed mechanism is simple and powerful. The gear box is recessed into the column, being rigidly supported without any overhanging part, and is driven by a sprocket chain direct from the spindle. Through the levers shown on the gear box 16 changes of feed are available in geometrical progression, the range being selected for greatest efficiency in ordinary milling. An index plate on the front of the box shows the entire range and the combination to obtain any desired feed. The levers for reversing all feeds and for automatically tripping them at any time are centrally located at the front of the knee, so that the operator has all the movements of the machine under his control without changing his position.

The column, base and bridge with the overhanging arm are cast in one piece, with substantial internal ribs which serve not only as tie plates for the sides of the column, but also form a series of handy shelves. The swiveling table on the universal miller shown in the illustration is easily and firmly clamped at any position by a bevel clamping ring. The universal dividing head is simple and compact. The illustration also shows the improved construction of the side center tail stock, which allows the use of large diameter end milling cutters up to within ⅛ inch of the center. For milling tapers this center can be readily raised. The telescopic elevating screw permits the table to travel to its lowest point without requiring a hole in the floor or foundation.



Motor Driven Milling Machine, Built by the Kempsmith Mfg. Company, Milwaukee, Wis.

Wood's Hydraulic Machinery.—During the past year Wm. H. Wood, engineer and builder of special machinery, Media, Pa., has erected a number of noteworthy machines, among which are the following: A 550-ton flanging press 12 feet between columns and 9 feet broad, fitted with a 160-ton cylinder in the head of the press and four 30-ton auxiliary clamping jack rams projecting through the table; main ram carrying the platen has a capacity of 550 tons, and is fitted with an internal ram for clamping of 110 tons capacity; total weight about 230,000 pounds. A hydraulic riveting machine with an 18½-foot gap in the throat, with multiple cylinders for putting a variable pressure on the rivet up to 150 tons; when required it is

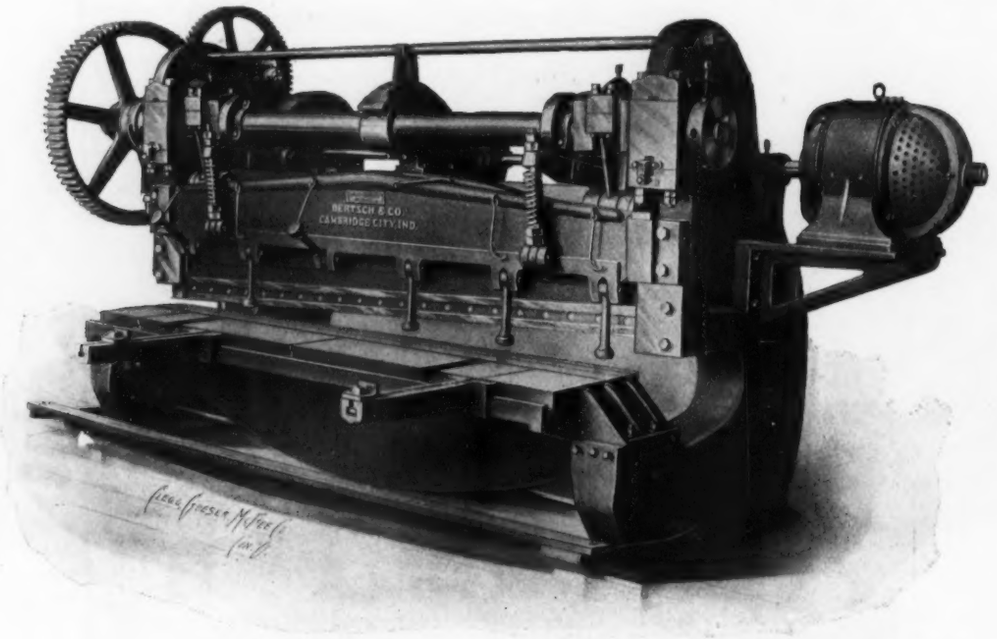
arranged with a plate closer for the heaviest work; built entirely of steel and weighs about 90,000 pounds. Both of these machines were built for the Canadian General Electric Company, Limited, Toronto. A special standard hydraulic riveting machine with a 9-foot gap, of extra heavy design, capable of putting a pressure of 100 tons on the rivet, for such special work as the riveting of steel castings to oil tanks with 1¼-inch rivets. An 8-ton hydraulic overhead crane for handling the work over a riveter. These tools were an addition to the hydraulic riveting plant previously put in by Mr. Wood at the Standard Oil Company's Works at Buffalo, N. Y. A Wood patent circular flanging machine for bending ogees on shells and also for flanging fire boxes and water bottoms for portable boilers. These were additions to the hydraulic riveting plant previously installed for Orr & Sembower, Incorporated, Reading, Pa. A hydraulic accumulator 8 inches in diameter by 10-foot stroke. A hydraulic duplex 16 x 2⅞ x 12 inch pump. A 10-ton hydraulic crane for handling work over a riveter. Installed at the Adam Loos Boiler Works, Toledo, Ohio. A hydraulic riveting machine with 9-foot gap, for variable pressure up to 75 tons. A 10-ton hydraulic overhead crane. An 8-inch x 10-foot hydraulic accumulator. A hydraulic duplex pump and other fittings. These form a complete hydraulic riveting plant for the Kelly-Springfield Road Roller Company, Springfield, Ohio. A hydraulic riveter with a 12-foot 4-inch gap, for variable pressure up to 100 tons. A hydraulic overhead 15-ton crane. A hydraulic riveter with 6-foot 3-inch gap for pressure up to 42 tons. A 3-ton overhead crane and 3½-ton hydraulic jib crane. A 12-inch by 14-foot accumulator. An 18 x 3¼ x 18 inch pump. Additions to the hydraulic riveting plant previously installed for the Frost Mfg. Company, Galesburg, Ill. Mr. Wood has also received a large number of orders during the past year for his patent automatic safety valves, for accumulators and cranes, and for his patent pressure reducing valves for attachment to hydraulic riveters.

In a paper on "The Electrolysis of Underground Conductors," presented by Prof. Geo. F. Seaver, at the recent International Electric Congress, the leakage current allowed in various places was reported to vary from zero to 1 ampere per pipe. A drop of 8.8 volts per mile of return circuit was allowed in Chicago and 3.3 to 6.6 in other cities. Most of the cities reported upon require a return circuit with the current capacity not less than the positive feeders. Only 10 out of 50 cities reported trouble from electrolysis.

The Bertsch Motor Driven Gate Shear.

A shear designed especially for rolling mills, where such tools are usually operated continuously to their full capacity, is shown in the accompanying illustration, being a recent product of Bertsch & Co., Cambridge City, Ind. It is imperative that a tool for this class of work be reliable and quick acting in shearing ¼-inch and lighter sheets and packs 10 feet long. A shear to meet these requirements is necessarily suitable also for general shearing in sheet iron shops.

The illustration shows the shear equipped with a patent hold down, actuated by cams on the main driving shaft, so designed that it is self adjusting for all thicknesses of metal. It should be noticed that the pressure legs or gags, and not the solid portion of the hold down, clamp the sheet, therefore the shearing line can be seen at any point at all times, and narrow strips can be sheared conveniently without danger to the operator. These legs or gags can be turned up and caught with hooks to hold them out of action, as two of them are shown, thus converting it into a plain shear without a hold down, which permits the top blade to be removed and replaced without taking off the hold down casting.



Motor Driven No. 8 Gate Shear, Built by Bertsch & Co., Cambridge City, Ind.

The shear is also provided with a patent center bearing, which consists of an adjustable wedge fitted between a bearing on the rear of the cross head and another bearing on the heavy cross tie casting bolted to the two housings, thus increasing the rigidity of the machine and making it impossible for the main cross head to spring.

This shear is heavy and properly proportioned throughout, having a heavy frame, strong gears, wide bearings, hardened steel pins and a forged steel crank shaft. It is triple geared, with the gears rigidly supported and self contained. It has a four-jaw clutch with steel faced jaws, and a cast steel switch ring acting against a steel plunger with a hardened steel roller that is easily but accurately and positively controlled.

The cross head bearings are provided with brass gibs for taking up wear. The crank shaft bearings are made of bronze set in split boxes that are easily adjustable or removable. Particular care has been taken in providing for the removal of either the crank shaft or main cross head with the least possible trouble.

When ordered for general shearing the machine is supplied with all necessary brackets and gauges. It is furnished with motor, engine or belt drive, and, when desired, with a sub-base plate.

The Stetter Automatic Bolt Trimmer.

A machine designed to automatically trim the heads of bolts up to 1 inch in diameter of shank has recently been brought out by the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., and is shown in the accompanying Fig. 1. An interesting and important feature is the new opening die, the parts of which separate to allow the bolt to be carried between them and close again before the trimming process begins. It will be noticed from Fig. 2 that the dies are reversible, the lower edge doing the cutting. Thus they may be reversed by turning the dies upside down or by turning the parts end for end. In another form the die parts are square, each edge being a working edge; hence there are four combinations, and with the reversing of each, eight changes of cutting edges available with one pair of dies.

Since the bolts are trimmed with the shank down, as shown in Fig. 2, the flash or fin under the head is trimmed against the side of the die, which avoids a burr underneath the head and does away with the necessity of tumbling after trimming. If the dies are nicely adjusted the head can be shaved the entire length of its side, not to trim the entire side of the head, but merely

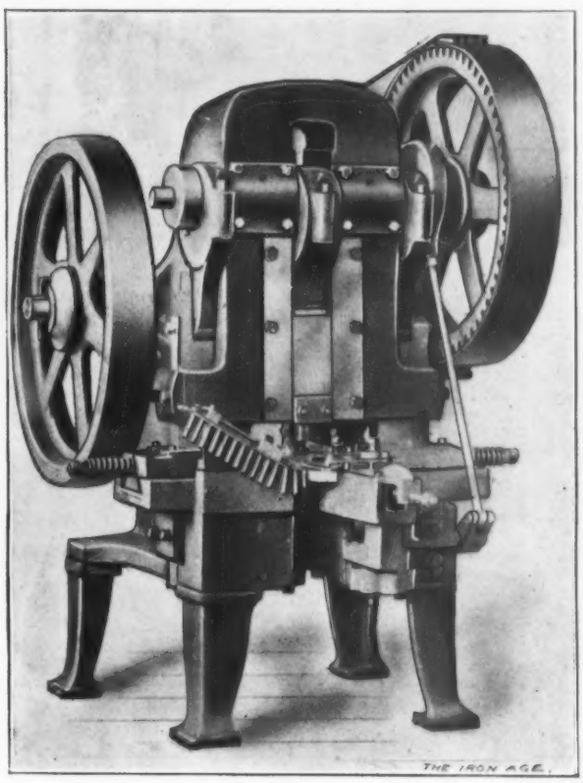


Fig. 1.—The Stetter Automatic Bolt Trimmer, Built by the Waterbury Farrel Foundry & Machine Company.

to shave it so as to leave the four sides square and parallel and of a smooth surface.

The machine is designed to finish bolts which have been made in a one-blow header—*i. e.*, a machine which cuts off a blank from a continuous rod and forms the head with one blow. This leaves the bolt in the form shown at the left in Fig. 3, with what is known as a flash under the head, but it produces a stronger bolt, so it is claimed, than if the bolt were made in a header with several blows to leave the head square so that it requires no trimming. Fig. 3 also shows the bolt after being trimmed.

An advantage of handling the bolt with the shank down is that any length of bolt may be trimmed, the only limit being the space between the dies and the floor, and if a greater length must be handled, a hole may be made under the machine in the floor and almost any length of bolt admitted. In the larger presses the bolts are delivered to the machine by gravity from a conductor, into which the bolts are fed by hand. This arrangement is shown in the machine illustrated in Fig. 1. In the machine for trimming smaller sizes the bolts are fed automatically from a hopper.

The automatic movements of the press are similar to those of other presses of this company's make and are obtained from cams on the upper shaft, which may be seen in Fig. 1. The work is fed to the dies and removed by slides, one of which carries a wire for cleaning away the scrap. Sliding movements also open and close the dies.

The capacity of the trimmer for 1-inch bolts is 40 a

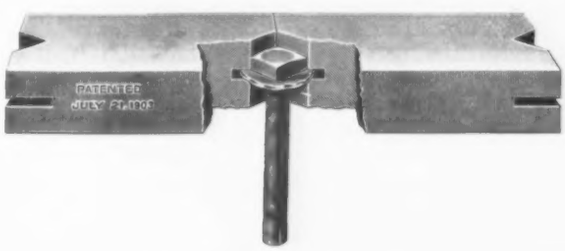


Fig. 2.—The Dies with Part Broken Away to Show the Position Taken by the Bolt.

minute or 22,000 in a 10-hour working day. The machine runs at 40 strokes per minute when the fly wheel runs at 135 revolutions per minute. An idea of the size of the machine may be had from the fly wheel, which is 42 inches in diameter and weighs 600 pounds. The weight of the entire machine is 8700 pounds.

The Philadelphia Foundrymen's Association.

The regular one hundred and forty-third meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club in that city Wednesday evening, January 4. The president, Thomas Devlin, called the meeting to order at the usual hour. The treasurer reported a balance of $1627.37, with all indebtedness paid.

An invitation was read from the New England Foundrymen's Association to join it, together with the Pittsburgh Foundrymen's Association, on the occasion of its next annual meeting, January 11, at the Exchange

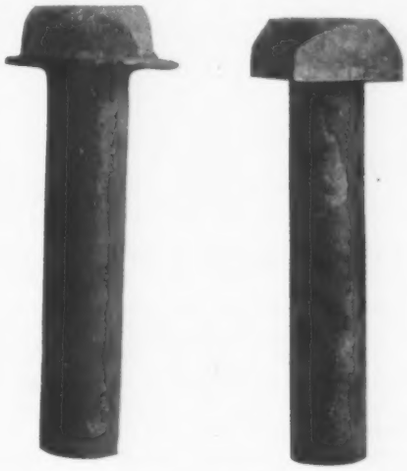


Fig. 3.—A Bolt Before and After Being Trimmed.

Club, Boston, Mass. The invitation was accepted, and efforts will be made to get out a large delegation.

The paper for the evening was on the subject "Oil as Fuel for Core Ovens," by S. F. Barnes, Holyoke, Mass. The paper was interesting and instructive and commanded the close attention of all present. A vote of thanks was tendered Mr. Barnes for his paper, after which the meeting adjourned.

An uninterrupted run of a year's duration is credited to a Parsons steam turbine built by Brown, Boveri & Co., Baden, Switzerland.

Buffalo Tools for the Blacksmith.

A new line of tools for use in the blacksmith shop has lately been brought out by the Buffalo Forge Company, Buffalo, N. Y., views of which are given in the accompanying illustrations. These include a tire upsetter, angle cutter, punch, drill and shear.

The tire upsetter, shown in Fig. 1, is of a substantial and simple construction, and a rather new design which has some advantages peculiarly its own. It is operated by inserting a lever in the socket shown at the left, and the movement of the lever is transmitted through a toggle joint to the left hand grip, which has a throw of 1¼ inches. The action is so powerful that one man may upset a 3 x ⅝ inch tire with a single stroke of the lever. The extensions on the grips are used to bring them down smartly on the work, while a light blow is sufficient to release them. The plunger shown between the two grips is brought to bear on the tire before upsetting and prevents any kinking or buckling of the work. A valuable feature of the machine is its ability to upset straight as well as curved iron. This is possible through the automatic adjusting grips with the assistance of the block seen immediately beneath the plunger. When tires or curved work are to be upset this block is removed. The lower grips have rounded under surfaces and fit loosely in circular recesses, so as to conform to any curved or straight work. The machine is constructed of steel armor plate and cast iron, the grips are of steel and the legs are of wrought iron pipe provided with holes for fastening to the floor. It weighs 267 pounds and is about 22 inches in length, and the hight of the grips from the floor is also 22 inches.

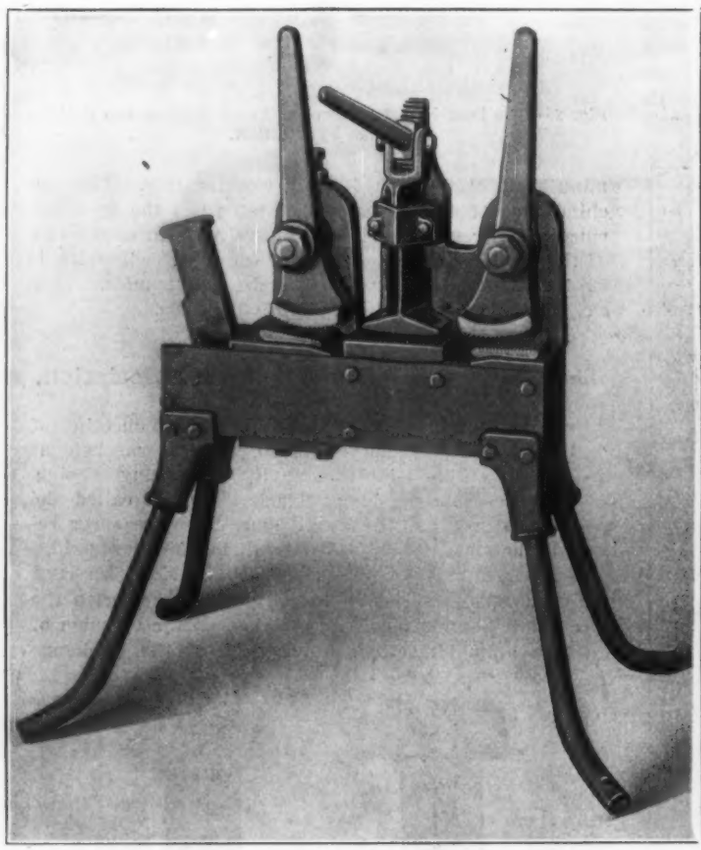


Fig. 1.—Tire Upsetter, Built by the Buffalo Forge Company.

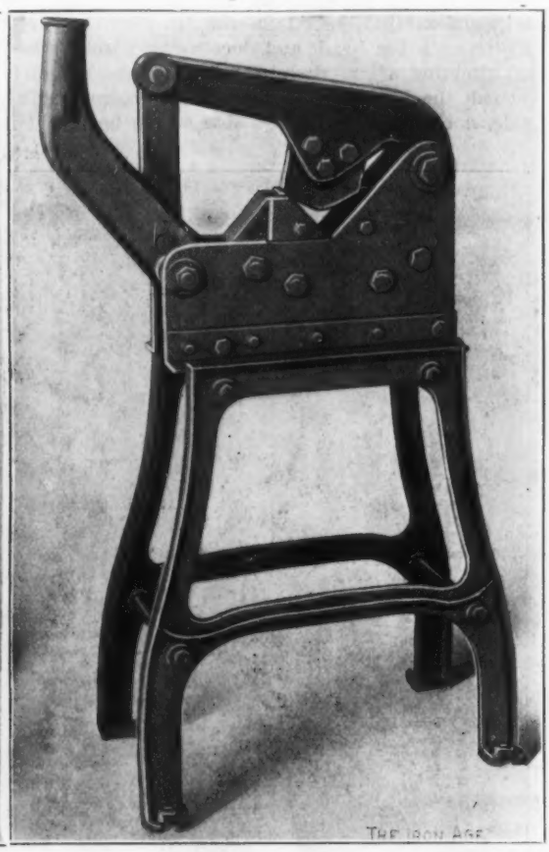


Fig. 2.—Buffalo Angle Iron Cutter.

Fig. 2 shows a steel plate angle iron cutter. This machine has the claim of large capacity for small weight. Although light and compact, the compound levers used enable heavy pressure to be exerted at the cutting edge. The tool is especially adapted for structural iron work and the use of blacksmiths. It will cut up to 1½ x ¼ inch iron or steel angle bar without leaving ragged edges requiring final dressing and consequent loss of stock; hence its use is desirable for accurate work. All of its parts are interchangeable. Its hight over all is 36 inches and it weighs 150 pounds.

Another machine constructed of steel armor plate is the hand punch shown in Fig. 3. It has been designed to take the place of the heavy and somewhat inconvenient cast iron punches which have hitherto been used. The steel plate construction is suitable for withstanding sudden excessive strains developed in this class of work, as has been shown by rigorous tests. It is strong and compact, and is claimed to have greater capacity than any hand punch of equal weight. There are three standard sizes made, of which the one shown in the illustration is the smallest. It will punch a 5-16-inch hole in 5-16-inch iron to the center of a 10-inch circle. It is mounted on a cast iron stand which may be fastened to the floor and weighs 150 pounds.

Compactness and strength are the main characteristics of the hand power drill shown in Fig. 4, although it has several additional features of merit. By an ingenious arrangement of the spindle head a set of ball bearings is inserted between it and the end of the feed screw, which practically eliminates friction at the point where it is ordinarily the greatest, and consequently where the maximum wear usually occurs—that is, between the slow speed feed screw and the swiftly rotating spindle. If the device were placed between the feed screw and its bearings it would be of little value. The automatic feed of the drill is actuated in the usual manner by an eccentric, ratchet and pawl. The feed may be thrown in or out of gear or adjusted while the machine is running. The hand feed wheel is easily reached and manipulated, and, being geared up to the feed screw, a quick motion of the drill spindle is obtainable. This machine will drill a 1¾-inch hole in the center of a 22-inch circle and has a run of feed of 6 inches. The back gears have a speed reduction of three to one and can be thrown in or out by loosening a pin. When it is desired to run the drill by hand power a heavy fly wheel running on ball bearings assists in attaining a steady, smooth running. The hight of the platen is adjustable and it can be clamped in any position. The drill spindle is fitted with a standard No. 2 Morse taper socket. Cut gears

are used with bearings reamed to standard size, so that interchangeability is assured. The machine is regularly furnished with tight and loose pulleys, or with a three-step cone pulley as shown in the illustration. Its total weight is 325 pounds.

The slitting shear shown in Fig. 5, like the punch and angle cutter, is also constructed of armor plate, with the same end in view of securing great strength and lightness within a small space. It is particularly intended for sheet metal work, and after continual heavy service it has been found that the machine was not warped, twisted or distorted. The illustration shows the smallest size of the tool, which will readily shear ⅛-inch stock. The shear has a work clearing jaw, so that sheets of any width may be sheared in successive cuts. A lever—not shown in the illustration—is used for operating the shear and is inserted in a socket in the short lever at the left. The stand is of cast iron and may be fastened to the floor or detached from the shear entirely when the latter is to be mounted on a bench. The machine equipped as illustrated weighs 110 pounds and measures 30 inches from the floor to the jaws.

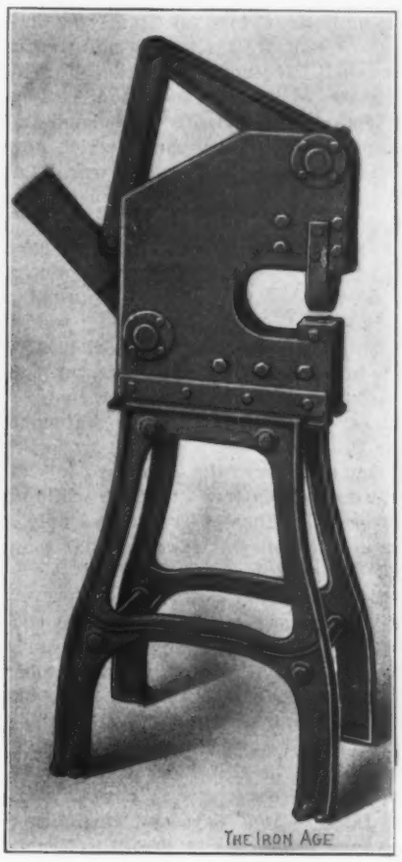


Fig. 3.—Buffalo Armor Plate Punch.

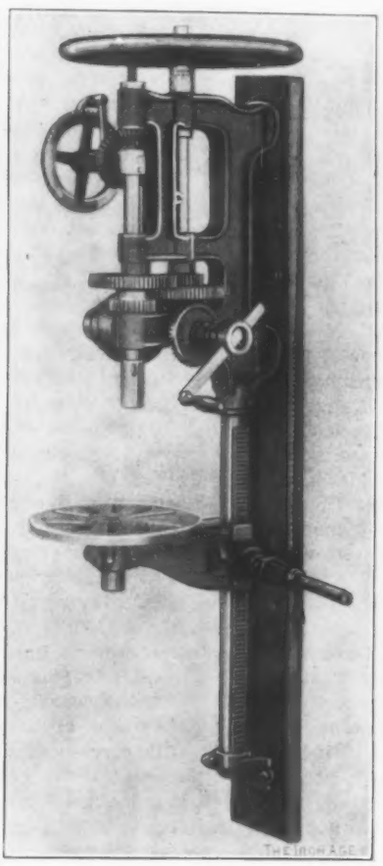


Fig. 4.—Buffalo Hand and Power Drill.

Fig. 5.—Buffalo Slitting Shear.

Recent Customs Decisions.

Several minor decisions affecting the classification of various metal articles were handed down by the Board of United States General Appraisers during the last week, most of them on January 5.

A protest by A. L. Salt of New York on the classification of certain iron bars or shapes was overruled because of a wrong claim made by the importers. General Appraiser Fischer, who writes the opinion of the board, says:

"The merchandise consists of iron bars or shapes about 6 feet long and 1½ inches in width, being material for use in the construction of electrical generators. Duty was assessed thereon at the rate of 45 per cent. as manufactures of metal. The only claim in the protest is that the bars are dutiable at 5-10 cent per pound under paragraph 125, as structural shapes. We are of opinion that the assessment of duty as made by the collector and the claim set up by the importers are both incorrect. Iron bars are denominatively provided for in several paragraphs of the metal schedule according to their composition, use, &c., and hence do not fall within the provisions of paragraph 193. On the other hand, the articles are clearly not 'structural shapes,' under paragraph 123, as claimed in the protest. We find from the testimony and the sample of the merchandise admitted in evidence that it consists of iron bars or shapes in the manufacture of which charcoal is used as a fuel. As no such claim is made in the protest the same is overruled and the decision of the collector will stand."

A protest by the Central Vermont Railroad Company against the classification of tin disks at 1½ cents a pound as tin plates is overruled. The importer claimed that they were dutiable at 10 per cent. as nonenumerated manufactured articles.

Another decision overrules a protest by J. M. Colpas, Burlington, Vt., against the assessment of duty at $6 each and 35 per cent. on two breech loading Enfield rifles, imported for the purpose of being incorporated into and forming a part of a machine known as the sub target gun machine, an apparatus invented and used for the purpose of acquiring precision in rifle shooting. It was claimed that they were entitled to free entry as machinery for repair.

The board also overrules a protest by Norman Carroll & Co., Chicago, against the classification as parts of breech loading shotguns at 50 per cent. of certain gun barrels. The importers claimed that they were dutiable at 25 per cent. as rifle barrels or parts of rifles.

Another protest overruled was by F. B. Vandegrift & Co., Philadelphia, against the classification at 45 per cent. as manufactures of metal of steel points for graphophones. The importers claimed that they were dutiable at 25 per cent. as needles.

When the electrification of the railroads which run underground in London is completed the traveler will be able to traverse 60 miles underground by electric traction without running twice over the same piece of track.

For Tariff Revision.

White House Conference Points to October Extra Session.

WASHINGTON, D. C., January 10, 1905.—The conference at the White House on the evening of the 7th inst. between the President and nine prominent Republican Senators and Representatives, at which the necessity for tariff revision was canvassed in detail, has served materially to strengthen the impressions reflected in this correspondence last week that the Dingley act will be very comprehensively overhauled in the coming Congress, that the work is likely to be done during the recess and probably at a special session to be held in October, the idea of a spring session having been abandoned. No incident of the current session has attracted as much attention as this conference, the developments of which were of much significance, showing that several prominent Senators, who heretofore have been regarded as the strongest of "stand-patters" are leaning toward tariff revision, apparently as the result of pressure brought to bear by their respective constituencies.

An Important Conference.

Widely differing reports of this important conference have been circulated in the daily press, but the correspondent of *The Iron Age* is able to give a brief but accurate outline of the exchange of views between the President and his callers. Those present were Senators Aldrich of Rhode Island, chairman of the Finance Committee; Allison of Iowa, Platt of Connecticut and Spooner, of Wisconsin, all members of the Finance Committee; Speaker Cannon and Representatives Payne of New York, chairman of the Ways and Means Committee; Dalzell of Pennsylvania, Grosvenor of Ohio, and Tawney of Minnesota, all prominent members of the Ways and Means Committee. Of these distinguished men, all of whom have had a wide experience in the drafting of tariff bills and in the discussion of customs problems of all kinds, Messrs. Allison, Aldrich, Spooner and Tawney very frankly stated that the time for the revision of the tariff was not distant. Senator Platt, Speaker Cannon and Representative Dalzell were outspoken in opposition to what they styled "tariff tinkering" either now or in the Fifty-ninth Congress, the Speaker declaring that throughout the recent campaign he spoke both in the East and West and never encountered tariff revision sentiment. Chairman Payne of the Ways and Means Committee and Representative Grosvenor had very little to say, but indicated that they were quite prepared to follow the President's lead if he should decide that revision was necessary, either at an extra session to be held during the coming recess or at the regular session of the Fifty-ninth Congress beginning in December next.

Senator Allison's Views.

Great interest attached to the statement made by Senator Allison, who happened to be the first called upon by the President to express his views. Senator Allison has a reputation for being one of the most conservative men in Congress, and owing to his ability to bring peace out of strife has come to be known as the great harmonizer. His particular brand of harmony usually takes the form of a compromise, and all his colleagues at Saturday's conference awaited with close attention the expression of his views, especially as in the controversies that have been waged in Iowa between Governor Cummins on the one hand and Secretary Shaw on the other, regarding the advisability of revising the Dingley act, the senior Senator has maintained a neutral position. On this occasion, however, Senator Allison said that he believed there was a demand for tariff revision in the West, and that certain modifications of schedules were desired in other sections. So far as he was concerned, he was quite willing to leave the matter to the judgment of the President.

On one important point, however, Senator Allison spoke with great freedom. He said that he had noticed in the press statements to the effect that members of the House were disturbed lest, as the result of the revision of the tariff, there should be a revulsion of feeling against the Republican party throughout the country whereby many Republican members of Congress would lose their seats. This, he said, was "pure nonsense." The Republican party would control both Houses in the Sixtieth Congress, in his opinion, whether the tariff was revised or not, and without regard to whether the schedules were comprehensively overhauled or merely "readjusted." Congress ought to do its duty without regard to political or personal considerations, but it ought to ascertain by very careful investigation just exactly where its duty lay in order that no blunders should be made.

Representative Tawney was one of the most outspoken of those present in insisting that there were many inequalities in the tariff that ought to be remedied at the earliest possible moment. He was re-elected on a platform pledging tariff revision. While he was not prepared to advocate a policy of free raw materials, he thought that in a number of schedules the rates should be reduced if not entirely repealed.

Senator Platt Against Revision.

Senator Platt of Connecticut stood out stoutly against the necessity of any changes in the tariff. He said that in his opinion present conditions not only called for no change, but were such as to indicate that modifications of any importance would be distinctly injurious and might speedily put an end to the prosperity which now prevails in all sections. Senator Platt's motto was, "Let well enough alone," and he emphasized it in characteristic fashion.

The President devoted himself chiefly to asking questions, but the trend of every inquiry showed his strong desire for tariff revision at an early date and at an extra session to be held some time during the coming recess. He seemed especially pleased that Senators Aldrich, Allison and Spooner should concede that certain features of the tariff needed readjustment.

Upon the conclusion of the conference a statement was given out by the President's private secretary to the effect that the tariff had been very fully canvassed in connection with one or two other matters, and that, while no conclusions had been reached, the conference was only a forerunner of others at which it was expected that some general policy would be determined upon.

As the result of this preliminary discussion, however, the general impression of those who attended the conference and have since reflected seriously upon the subject is that an extra session will be called next October for the revision of the tariff. The spring session plan has been abandoned for reasons heretofore set forth in this correspondence. A subsidiary plan is now being discussed with considerable favor involving authorization for the meeting during the recess, either in joint or separate sessions, of the Finance and Ways and Means committees for the purpose of drafting a tariff bill to be presented either at the special session or the regular session in December.

A Time Saving Device.

It has been customary in the past for each committee to draft its own bill, and when the House measure has reached the Senate it has been stricken out and the Senate bill substituted, with the result that two or three weeks are usually occupied by the Conference Committee in harmonizing the difference between the two houses. Joint sessions of the two committees would result in the drafting of a single bill that would be fairly satisfactory to both houses and much time would be saved. Such a measure could be passed by the House after a debate lasting not more than a week, and practically all the time consumed in revising the tariff would be spent in the Senate discussion. Those who oppose a special session next fall point to this method as likely to economize time to such an extent as not to seriously interfere with the current business of the regular session. In any event, if it should be adopted it would reduce the length of the debate very materially, and as applied to a special session beginning in October would probably enable Congress to adjourn a week or two in advance of the December meeting.

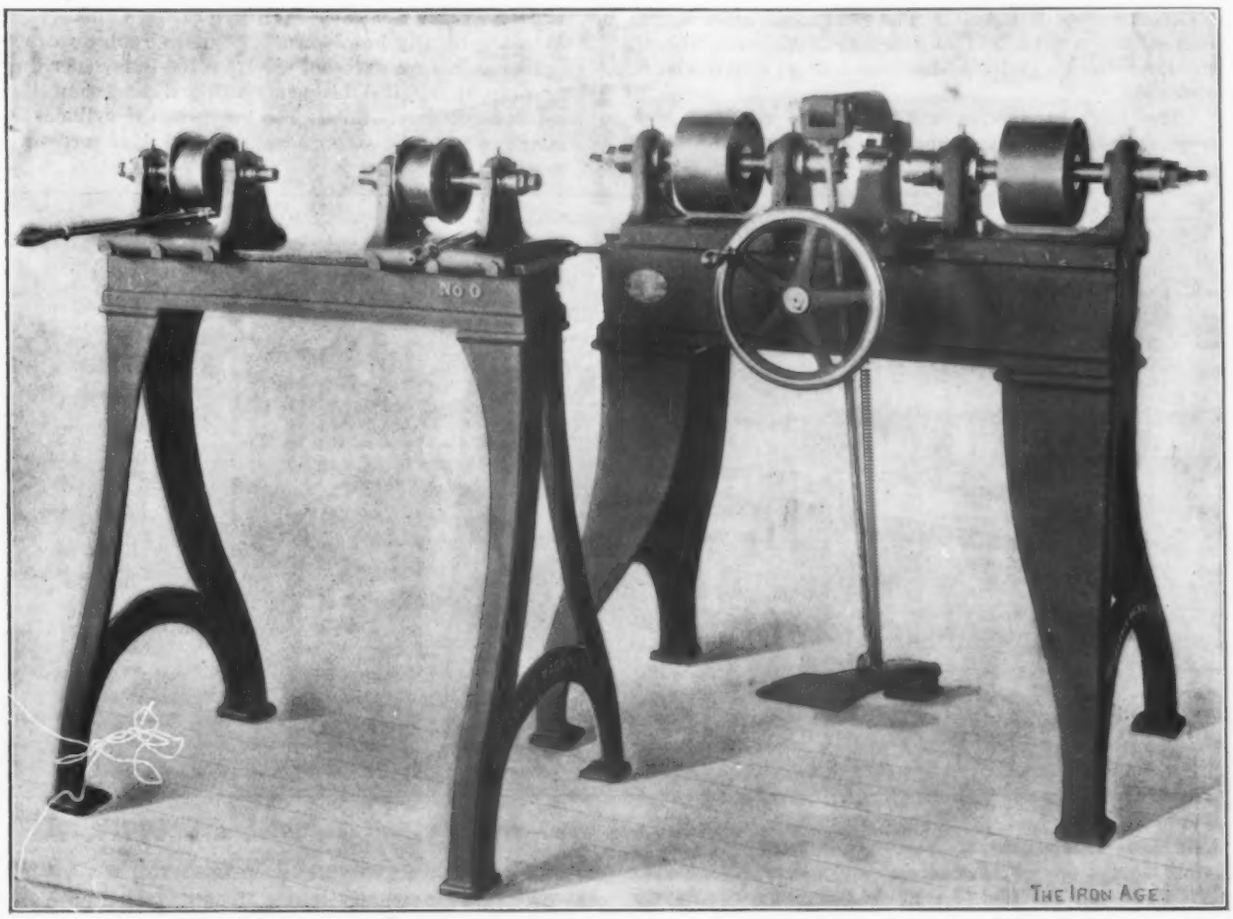
W. L. C.

Garvin Duplex Drill Lathes.

In the manufacture of various parts of standard machines and hardware specialties it is often necessary to perform such operations as turning, drilling, facing, grooving or counterboring on the opposite sides or ends of a piece. For these operations the Garvin Machine Company, New York City, has built a line of duplex machines, two sizes of which are shown in the accompanying illustration. The pieces which it handles may be of any shape and different operations may be performed on the two ends or sides without difficulty. The principal advantages of these double end machines are that the two ends or sides of the piece may be finished simultaneously, saving time, and that perfect alignment of the work may be secured. With proper fixtures to clamp the work, boys may be employed to operate the machines, and the work will be produced to perfect gauge.

The work is held in a rigid fixture in the center of the machine, and the heads are fed to it from each side, being fitted with adjustable stops. In the larger machine, the one shown at the right, the heads are advanced by screws operated simultaneously in opposite directions by the large hand wheel in front, and in the smaller size machine the heads are moved independently by the levers shown. The sliding head construction is one giving a rigid, quick acting machine which maintains its alignment and is considered by the builders superior to a machine in which the spindles slide. The tools may be arranged to fit directly on the noses of the spindles or on arbors fitted to the taper holes in the spindles. The spindles run in bronze boxes adjustable for wear. The driving pulleys on the countershaft are drums to allow for the travel of the heads.

On the larger machine are shown the work holding fixture and the cutters for boring, turning, facing and cutting a groove in the opposite ends of concentric shells used in a patent hinge made by the Soss Invisible Hinge Company, which was described on page 61 of *The Iron Age* of November 17, 1904.



Nos. 0 and 1 New Style Duplex Drill Lathes, Built by the Garvin Machine Company.

The Steel Corporation's Profit Sharing Plan.

The Finance Committee of the United States Steel Corporation has decided to repeat the offer to the officers and employees of that corporations and its subsidiary corporations to subscribe to the preferred stock on substantially the same basis as heretofore adopted. The same amount of stock—namely, 25,000 shares—will be offered for this year. The price has been fixed at $87.50 per share, in order to make the investment attractive. This price, it is stated, with the rebates and other perquisites which may be received in case of continuous employment and satisfactory service, will make the final cost low.

The Steel Corporation inaugurated this plan of profit sharing in January, 1903, making the subscription price $82.50 per share. Those who did not part with their stock in the meantime completed their payments in November, 1904. They received in that time dividends amounting to $14 and one bonus of $5, or $19 in all, making their actual cash investment per share $63.50. In January, 1904, the offer was repeated, the price then being fixed at $55 per share.

The employees' subscriptions to the first offer totaled 48,983 shares and to the second offer 32,519 shares.

The McCullough-Dalzell Crucible Company, Pittsburgh, Pa., is distributing a neat little desk souvenir in the shape of a miniature plumbago crucible mounted on a wooden base plate. There are several useful ends to which the article may be put, as a paper weight, a receptacle for pins or fasteners, an ash receiver or a holder for pencils or pens.

The official report of iron ore receipts at Ashtabula Harbor for 1904 shows that 3,671,367 tons were received and that 2,161,423 tons were shipped. This gives Conneaut a lead of only 412,388 tons in ore receipts over Ashtabula Harbor.

The Connellsville Coke Trade in 1904.

A recent issue of the *Independent*, Scottdale, Pa., contained a review of the coke trade for 1904 and also the present condition of this trade, as follows:

Last week rounded out the year with a splendid production, considering the fact that 82 of the 91 active plants lost a day by observing the Christmas holiday. Over 228,000 tons were produced. Over 1000 idle ovens were fired during the week. Owing to the crowded condition of the yards at many plants an effort was made to load some of the stocked coke on Christmas Day with the result that nearly 1000 cars were sent out of the region.

With the firing of the large number of ovens last week the Connellsville region is almost up to the highest working point in its history. Of the H. C. Frick Coke Company's nearly 15,000 ovens only 434 are idle, and in the Masontown field this company has nearly 2500 ovens, of which every one is in blast. The demand for coke is such that within a week or two every available oven in both the Connellsville and the Masontown fields will be put in operation.

The total production and shipments for December were very satisfactory compared with the balance of the last quarter. The total production and shipments for the four quarters of the last year were as follows:

	Production. Net tons.	Shipments. Net tons.
First quarter	2,548,837	2,438,174
Second quarter	2,656,127	2,465,901
Third quarter	2,323,838	2,334,461
Fourth quarter	2,698,307	2,664,697
Totals	10,227,109	9,903,233

Following is a comparison of the yearly production for the last five years:

	Net tons.
1900	10,207,524
1901	12,004,056
1902	12,726,550
1903	11,073,311
1904	10,227,109

From this it will be seen that the production for 1904 was 846,202 tons less than that of 1903 and much less than that of any year since 1900.

The summary of the Connellsville region corrected to December 31 shows a total of 23,075 ovens, with 20,974 in operation and 2101 idle, the changes for the week, including the addition of 1005 ovens to the active list, carrying the list of ovens in operation to the highest point since the first week in August, 1903. It is thought that the water supply will now be sufficient to warrant the firing of all ovens in condition to be operated.

The Norwalk Air Compressor.

In many places where compressed air is used there is a need of two pressures, one of from 80 to 100 pounds for pneumatic tools, such as hoists, hammers and chippers, and one of 20 to 25 pounds for sand blasting, painting and blowing chips from work. The compound air compressor, shown in the accompanying illustrations, is designed to furnish air at two pressures at the same time in any proportion, fixed or variable, or all at a high pressure or all at a low pressure. The action of the machine in providing for these variations is entirely automatic by means of skip valves, used as the inlet valves of the second or high pressure cylinder. The use of a reducing valve is entirely done away with, the low pressure air being drawn direct from the intercooler, through which the air passes from the low pressure cylinder to the high pressure cylinder. The compressor is built by the Norwalk Iron Works Company, South Norwalk, Conn.

It has generally been considered undesirable to draw low pressure air for external use from the intercooler, for the reason that with the usual valve arrangement the pressure immediately falls. The low pressure cylinder is forcing air into the intercooler, and the high pressure cylinder is as constantly taking it out. If the pressure in the intercooler is to be maintained constant under such conditions then the high pressure cylinder must work slower when air is being removed from the intercooler for outside purposes. It will not answer to shut off the supply to the second cylinder by throttling its intake, for if this be done the little air remaining in the inlet ports falls to a very low pressure. From this low pressure in a few revolutions the air is compressed to the high pressure of the final discharge, which causes the development of excessive heat. The usual practice where a single compressor is used is to obtain low pressure air from the high by using a reducing valve, which means a waste of power so great that it is better to employ two compressors, one for high and one for low pressure. It is argued that such a combination is inelastic, in that one compressor cannot help the other, and that the use of two machines is more expensive of power. In other words, less power would be required if a single compressor could furnish both pressures of air. It is seldom that the maximum demands of the two systems come at the same time, so that the capacity of a single compressor need not be as great as the combined capacity required in the two-compressor arrangement.

The valve mechanism which makes possible the delivery of two pressures of air from one compressor is shown in Fig. 2, the high pressure cylinder being at F.

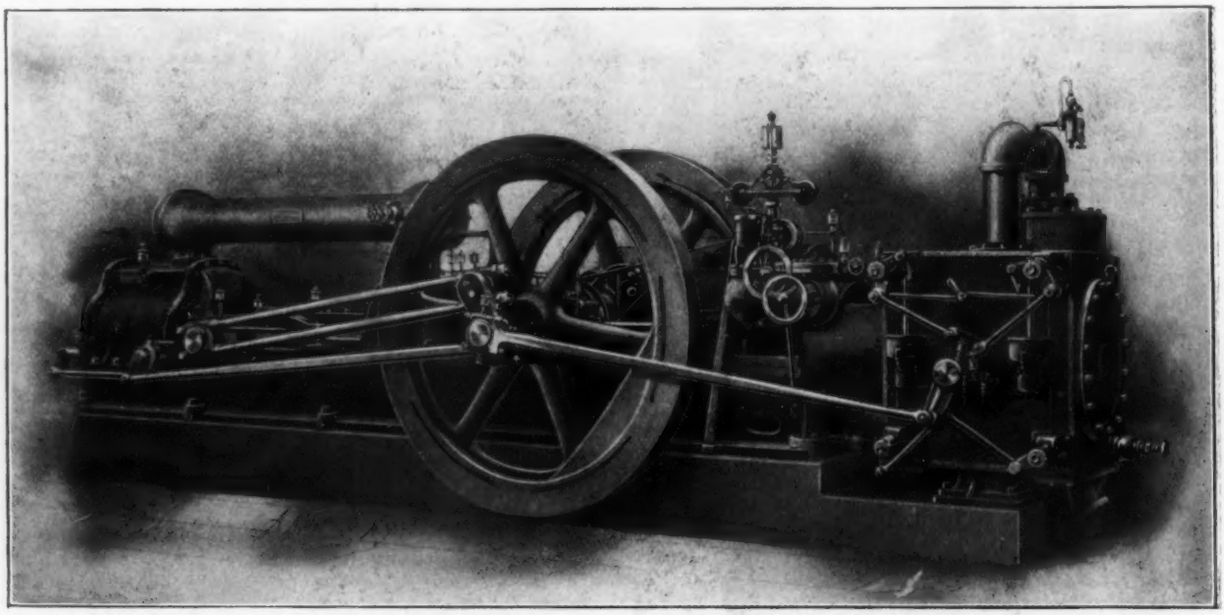


Fig. 1.—Compound Air Compressor, Built by the Norwalk Iron Works Company, Capable of Delivering Air at Two Pressures.

The low pressure air from the intercooler enters at the ports A and A at a pressure of 25 pounds, which may be changed by varying the relation of the cylinder volumes. The normal pressure—that is, 25 pounds—holds the plunger B in the position shown in the drawing. But when the pressure of air in the intercooler falls below 25 pounds, as air is withdrawn for low pressure uses, the spring C overcomes the air pressure and forces the plunger forward against the end of the valve stem D, which action opens the valve E, the inlet to the high pressure cylinder. The cylinder rejects its air, throws it back into the intercooler and becomes itself inoperative. But immediately the air of the intercooler again reaches its normal pressure it overcomes the spring C and the plunger retires, leaving the valve to perform its regular functions. The skip valve may remain open any number of revolutions or only a part of one revolution, as circumstances may require. In the meantime the speed and pressure governors of the machine regulate its speed to suit the demands of the two air systems.

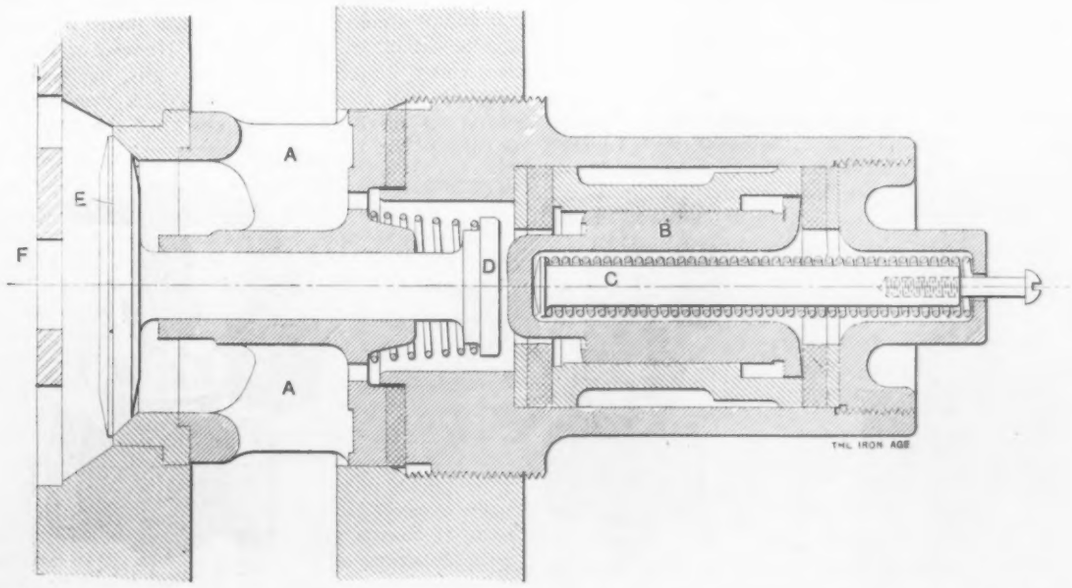


Fig. 2.—Detail of the Pressure Regulating Valve in the Intake of the High Pressure Cylinder of the Norwalk Compressor.

Any quantity of air up to the limits of the machine may be drawn off at any time and the speed will be automatically adjusted.

The Milwaukee Pumping Engine Contract.

We are in receipt of an interesting document which plainly shows what it costs to tamper with free competition in public contracting. The occasion for the appearance of this document, which is a demand on the city council for attorneys' fees, is the recent controversy in the city of Milwaukee, Wis., relative to a contract for a pumping engine for the water works of that city. Our readers will remember that the original advertisement for bids for this engine provided that the work was to be done by men employed by the bidders for not more than eight hours in each working day during the pendency of the work upon the engine. In response to this advertisement only one bid was received, which came from the William Tod Company, Youngstown, Ohio. The bid of this company named $74,000, which was accepted by the Board of Public Works of Milwaukee. Before the contract could be carried out T. J. Neacy and Walter Read of the Filer & Stowell Company, Milwaukee, brought an action as taxpayers against the city of Milwaukee seeking to enjoin the execution of the contract on the ground that it was illegal because of the resolution passed by the city council in relation to the number of hours the laborers should work upon the engine. The case was tried in the Circuit Court of Milwaukee County, and judgment was rendered in favor of the plaintiffs, decreeing, among other things, that the contract was void and restraining the city and William Tod Company from doing any act or thing in performance of the contract.

After the entry of the judgment the Board of Public Works again advertised for proposals for the engine, omitting any provision in relation to the number of hours in which employees should be required to labor upon the work. In response to this advertisement several bids were received, and the lowest bid was made by the Brown Corliss Engine Company, Corliss, Wis., naming $64,500. It appears that the plans and specifications upon which this second contract was conditioned differed in material respects from those upon which the contract was entered into with the William Tod Company. The first specifications called for a pump which would lift 150,000,000 pounds of water 1 foot high for every 1000 pounds of feed water, while the second specifications required the pump to lift 160,000,000 pounds of water under similar conditions. The second specifications called for a cast iron sole plate or foundation plate for the engine, which, it is stated, would cost $3600, while the first plans and specifications did not contain this requirement. Further, the second plans and specifications called for an engine of 175,000 pounds greater weight than did the first plans and specifications.

Messrs. Neacy and Read have laid before the city council of Milwaukee a claim in which they state that the changes in the specifications cause the engine thereby called for to cost for its manufacture approximately $6000 more than the engine called for by the first specifications, and they allege that by reason of the suit brought by them the city of Milwaukee was saved the difference between $74,000, the contract price in the first contract, and $64,500 the contract price in the second contract, as well as the further sum of $6000, the difference in value of the pumps as above stated, making the total saving by reason of their efforts of $15,500. They further allege that in order to commence and maintain the action through which this saving was made to the city they were compelled to employ attorneys, and that the liability thus incurred amounted to $1000, which they consider a reasonable charge for the services as rendered. Inasmuch as the action brought by them was for the benefit of the city and not for their personal benefit, and consequently the city of Milwaukee was saved $15,500, they demand that the city should pay the attorneys $1000 for the services rendered and the disbursements made in the commencement and maintenance of the action.

The facts given in the document which sets forth the above details are highly instructive, as they show how much more a city would be obliged to pay for the work done by it if an eight-hour law were to be enforced on all work performed in behalf of the city.

The New Crane Valves.

A line of improved renewable seat and disk globe and angle valves has recently been brought out by the Crane Company, Chicago. These valves are suitable for working pressures up to 250 pounds, and are tested to 700 pounds pressure per square inch. As the accompanying illustrations show, they are an improvement over previous construction and embody several new and valuable features. The renewable parts are made of hard composition of long wearing quality and are especially suitable for work where high pressure is used and where the wear and tear on the valve is severe.

By unscrewing the nut on the bottom of the valve shown in Fig. 1 all parts are accessible and removable from the top, so that a new seat or disk may be conveniently substituted for any worn part replaced. The disk being attached to the stem by a slot is easily removed. The seat and disk can be removed and the two ground together if necessary. In putting the valve together the seat is replaced, the nut on the bottom of the valve, which holds the seat in place, is tightened and the bonnet is screwed on, closing the valve. The valves may be packed when wide open without allowing steam to escape.

The Crane patent renewable seats and wedge straightway valve, illustrated in Fig. 2, is made with copper seats and hard metal wedge. It is suitable for working pressures up to 250 pounds, and is tested to 800 pounds pressure per square inch. The ready method of inserting the renewable parts and the wide range in the use of these valves on all kinds of severe service are their important advantages. Soft metal rings or seats are furnished for water or air, when so specified.

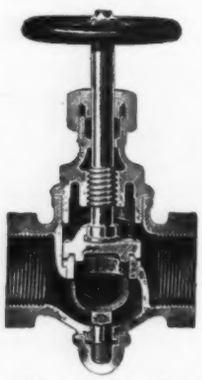


Fig. 1.—Globe Valve.

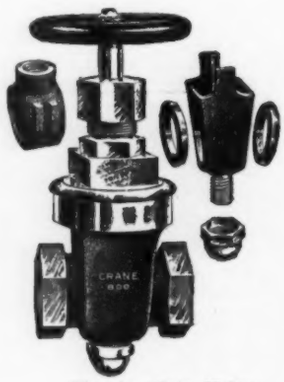


Fig. 2.—Gate Valve.

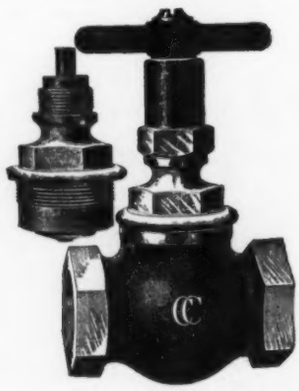


Fig. 3.—Radiator Valve.

THE NEW CRANE VALVES.

The Crane "self packing" globe and angle and radiator valves are made with Jenkins disk and nonrising stem and obviate the annoyance of leaky stuffing boxes. Attempts to produce a self packing valve are usually unsuccessful because two metallic parts are used, which, grinding together, soon become leaky. In the Crane self packing valve, Fig. 3, a piece of vulcanized rubber is introduced between these two metallic parts, which makes a perfect seat. When eventually one of these valves does become leaky a new vulcanized rubber disk can readily be inserted. The application of this device to globe and gate valves obviates constant attention in looking after leaky valves.

The bonnets of the self packing valves, one of which is shown in Fig. 3, have threads of the same size as those in the Jenkins disk valves, made by the Crane Company, and the old style trimmings can be replaced by this new self packing device without removing the valve. The self packing device can also be applied to any of the Crane brass wedge gate valves with nonrising stem.

A railroad museum is proposed to accommodate relics and curosities connected with railroading. A good beginning for such a collection is likely to be offered in the large historical exhibit of the Baltimore & Ohio Railroad at the St. Louis Exposition and other exhibits which will be available. The Baltimore & Ohio exhibit, which is in charge of J. G. Pangborn, was first shown at the Columbian Exposition in Chicago in 1903, and was then presented to the Field Columbian Museum. That institution has about decided to abolish its applied science section and confine its collection to articles pertaining to pure science. A large building in Philadelphia has been offered to house the proposed railroad museum.

Niagara Falls Electric Power Increased.

The Canadian Niagara Power Company started the first two 10,000 horse-power units in its new station in Victoria Park, on the Canadian side at Niagara Falls, on the morning of January 2. In anticiption of the important event a few invitations had been issued to the commissioners of Victoria Park, power company officials and a few others interested in the development of Niagara. There were present William H. Beatty of Toronto, president of the Canadian Niagara Power Company; A. Monro Grier, secretary and solicitor; W. H. Brouse, Edward D. Adams, Edward A. Wickes, Francis Lynde Stetson and William B. Rankine of the Board of Directors; George Urban, Jr., and Charles R. Huntley of Buffalo and De Lancey Rankine of Niagara Falls, engineers of the company, and others. At 11.30 o'clock President Beatty moved the small wheel that governed the flow of water on turbine No. 1. The unit responded instantly, and the first of the big 10,000 horse-power generators started to revolve. Gradually its speed was increased until it was making 250 revolutions a minute, and then the second unit was successfully started.

In thus starting its great plant the Canadian Niagara Power Company lives up to its agreement with the Canadian Government, its contract calling for a development by January 1, 1905, involving the construction of a tunnel with a capacity for the discharge of water sufficient to produce 100,000 horse-power, a canal or intake from the river with a capacity of 50,000 horse-power, a wheel pit with a capacity of 50,000 horse-power and 20,000 electrical horse-power ready for use, sale or transmission. But the works has been constructed on a larger scale than called for in the agreement, so that the company has a canal, tunnel and wheel pit complete for the development of 110,000 horse-power. The power house is well along, and a total of five units will be installed and ready for operation by May 1. In the wheel pit and station there will be room for six additional turbines and generators of the same size, and these can be quickly installed as the demand requires their installation.

The turbines were designed and manufactured by Escher, Wyss & Co., Zurich, Switzerland, while the generators were made by the General Electric Company, Schenectady, N. Y. The water is led to the turbines from the canal by penstocks 10 feet in diameter, and after driving the wheels is discharged through a tunnel 2200 feet long at a point in the gorge close to the foot of the Horseshoe Falls.

The Canadian Niagara Power Company is owned by the Niagara Falls Power Company, whose power houses on the New York side contain installations of 105,000 horse-power capacity. The power house of the Canadian Niagara Power Company is connected with these two

power houses on the New York side by cables laid in conduits through the Canadian Park and City of Niagara Falls, crossing the river on the upper steel arch bridge. It is possible to operate the three big stations as one plant, and thus every power customer of these two companies, whether he be on the American or Canadian side, has the assurance of continuity of a supply of power given by these connections. This international development under a single direction may be expeditiously enlarged from its present output by the installation simply of the additional units of machinery for which the Canadian works is prepared. It may be still further enlarged by the exercise on the part of the Niagara Falls Power Company of its already acquired right to a further development of an additional 100,000 horse-power by means of another tunnel.

Chile to Pay a Bounty on Iron.

From the *Board of Trade Journal*, London, we learn that the commission appointed by the Government of Chile to treat with a French firm for the establishment of the iron industry in that country has terminated its labors and has drafted an agreement *ad referendum* for presentation to Congress. By this agreement the president of the republic is authorized to enter into a contract with M. Carbonel for the establishment of the iron industry in Chile, subject to certain specified conditions. It is stipulated that the Chilean Government shall pay to M. Carbonel a bounty on the iron and its derivatives produced in Chile for home and foreign consumption. No bounty will be paid, however, on the articles for home consumption when these articles are protected by an import duty equal or superior to the bounty.

The period during which the bounty is to be paid is fixed at 20 years, and the bounty is fixed at $10 per metric ton on pig iron and $20 per metric ton on manufactured iron and steel. After the twentieth year the bounty is to be decreased by one-tenth per annum, so that it will cease altogether in the thirtieth year. The bounty is to be paid quarterly, but payment of bounty is to cease when the production reaches 35,000 tons—per annum it is to be supposed, but the published copy of the agreement does not say so.

It is stipulated that the Government shall give a 5 per cent. guarantee on the capital invested in the undertaking, subject to the following limitations: The total sum guaranteed is not to exceed $3,000,000 for works capable of producing 7500 tons a year, $4,000,000 for 15,000 tons, $5,000,000 for 25,000 tons, $6,000,000 for 35,000 tons and $7,000,000 for 45,000 tons. The guarantee is to take effect from the day the first blast furnace is in operation. The guarantee, however, will not be payable if the production should not exceed 7500 tons a year in the course of the five years after the first year's operations and 15,000 tons in the following years, accidents and *force majeure* expected.

The Government is to have the right to appoint inspectors of the works and of the accounts. At the end of May of each year a balance is to be struck to show the net profit of the undertaking, and the difference between the guaranteed interest and the net profit to be paid by the Government in the course of the first quarter of the following year. When the net profit exceeds 6 per cent. on the invested capital the excess is to be paid to the State as a reimbursement for the money, without interest, it may have paid on account of guarantee.

The State makes to M. Carbonel a free grant of 100 hectares of land; the right to exploit during 30 years in Valdivia 80,000 to 100,000 hectares of forest, the concessionnaire to have the right during 15 years to purchase the whole or part of the forest. Within six months after the delivery of the forest the concessionnaire is to deposit, under penalty of forfeiture of concession, $100,000 as guarantee for the fulfillment of the agreement, which sum will be returned to him as soon as the first blast furnace is in operation. If within the term of three years, to be counted from the delivery of the forest and land, the first blast furnace should not be in operation the concession is to become null and void and the guarantee to be forfeited.

Rolls for Uneven Angles.—I.

BY WILLIAM HIRST.

In rolling a billet through the successive passes of a series to form an angular section, or a section having reverse curves, the operation divides it into two or more parts which, in the finished section, are called "legs." In the common angle bar, for example, there are two; in the Z-bar, three. After the first three or four passes these divisions or members of the section become well defined, and the appearance of the passes themselves shows that no action of the rolls can force the metal to flow from one part or division to another to any appreciable extent, so that the possibility of forcing a superfluous amount of metal from one part or division to another is at an end.

When a comparatively thin or light division of a section is between two heavier ones, as in the case of a beam, a disproportionately heavy draft on that part would cause it to bulge or to become in some way distorted. It is difficult to describe in words the various manifestations of unequal or, to be more accurate, disproportionate draft. It is sometimes shown in the appearance of the bar itself, but more in the manner in which it enters or leaves the rolls. On bar mills these manifestations are well understood. The least deviation from the line is seen at once by a good roller; the smallest tendency to turn over is as readily seen, if not actually felt, before the occurrence takes place, but with sections of less compact form and evenness of character, while an improper movement may be detected, the remedy is seldom with the roller, as the fault may be in the particular pass or its neighbors. These unfavorable indications are most marked in the last passes of the series and they become exaggerated if the bar is allowed to cool from some delay.

In the case of the common angle of equal length of leg, if the draft is proportionately too great at the root the bar will bend, making the root convex; should the preponderance of draft be at the edges the result will be the opposite. If from an endwise movement of one of the rolls, or a faulty adjustment in that particular, causing one side of the bar to be made thicker than the other, thus making the draft heavier on one side in the next pass, it will bend in this, as in all similar cases from a like cause, away from the greatest reduction.

Relative Diameters.

The same effects as from an improper distribution of draft may be caused by the relation of diameters of the two rolls forming the pass. If the setting of the pass in the rolls is such that the diameters on one side are larger than those on the other, that side will deliver faster, which will cause the bar to bend away from that side in precisely the same manner as a disproportionate draft. Again, if the mean diameter of the working surface of one roll in a pass is much greater than the other, the tendency is for the largest diameter to force the bar away from it. These two causes may combine in various degrees, compounding the action of the bar, in which a twisting motion may be added to deflexure.

It is possible that a series of passes, correct in general principles, may work badly from these causes singly or in combination. It is therefore of the first importance, in the construction of the passes, to see that the areas of the different divisions or members of the section bear as nearly as possible the same relative proportion to each other as they do in the finished section, and to set the passes between the rolls so that the opposing surfaces forming the pass will have the most favorable influence on the bar passing between them.

Disproportion in Draft.

It is evident that, after these divisions are established and the flow of metal from one to another is no longer possible, any considerable disproportion will manifest itself in some or all of the remaining passes of the series. The effects are not always the same and are sometimes laid to errors in the details of the construction of the pass first showing them. It may be accepted as a rule that with sections having members or divi-

sions of uneven thickness, any disproportion in draft will be shown by the light member. That is to say, if there is too much draft on the heavier part of the section, the greater elongation of that part must draw out the lighter and cause more or less shortage in its dimensions; if there is too much draft on the lighter part it will be shown by overfilling on that side of the pass, deflecting the bar, or both.

These effects are most common with angles and analogous shapes. Other sections manifest them in ways peculiar to themselves. It is evident that if each division of a section is to draw out concurrently, each must be reduced in like proportion; if not, that part being reduced the least must either fall short in its length or its cross section. In what manner and to what extent a disproportionate draft will affect the working of the bar depends somewhat on the area of the pass, the character of its section, or both. If the area is large and the flow unobstructed, there may be no visible effect; on the other hand, if the area be comparatively small and the flow confined, it is certain to manifest itself in scant dimension or in distortion.

Referring to angles particularly, if the draft in one division or leg is proportionately heavier than the other, through bad design, inferior workmanship or through the rolls themselves working out of their place, it is made evident by the conduct of the bar, generally, in the way previously explained. In extreme cases, if the guides permit it, the bar on the incoming side of the rolls may be forced against the side of the pass, across the corner of the collar, causing it to grind off the edges of the bar and sometimes to sliver. It is exceedingly difficult to describe the cause or causes of any particular action of a bar. In fact, when rolls appear to work badly it frequently taxes the skill of the most experienced to locate the cause, which is often found where ordinarily it would be least expected.

Position of the Pass.

To facilitate the laying out of the passes and to more readily determine their position, we assume an imaginary line drawn through between the rolls equidistant from their axes and parallel thereto, which is known as the pitch line. Twice the distance of the pitch line from the axis or center of the roll is called the pitch diameter, which is the nominal diameter of the roll. The primary consideration in laying out a series of passes is to determine the position of the section relative to this line. There are some sections, such as I-beams, channels, T-rails, and the like, whose forms naturally admit of but one position. There are others of such form that it would be difficult if not impossible to make without being opened so that the working surface of the roll may be in contact with every part of its outline or to make it possible to get the bar through the pass.

It is a fundamental principle in roll turning so self-evident that it seems superfluous to mention it, that a pass must be narrowest at the bottom of the groove and widest at the top, and that each side from the bottom upward must taper outward, although such taper may be of small degree. If the section will not conform to this principle in its desired form it must be opened, rolled down in that form and finally bent into the shape required. No matter in what direction the outline of the pass may be, each part revolves in a plane at right angles to the pitch line, and the nearer the reducing surfaces are parallel to this line the more effective they will be. Hence, whenever a certain part of a section requires a comparatively heavy draft, by turning that part into this position we may set it most favorable to that end. It is, therefore, important that due consideration be given this point that the bar may be produced most quickly and economically.

Practical Examples.

Rolls for producing standard angles are required to be capable of making them of different thickness of section. This is accomplished partly by using extra finishing passes and partly by increasing the distance between the rolls. In connection with this it is required that the pass shall be set so that each leg of the angle will have an equal increase in thickness when the rolls are so separated. This means that the legs of the section must be equi-angular to the axes of the rolls unless some provision is made for moving them endwise coincident with their movement apart. Where the bar is required to be of one thickness only, these particulars need not be considered, and a position best suited for the smooth and even delivery of the bar may be adopted.

It is sometimes necessary, as in the case of Fig. 12, that certain surfaces of a bar must have the highest attainable degree of accuracy in their relation to each other and to a given standard of shape and size. The

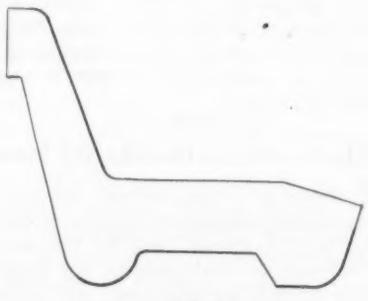


Fig.12

outside surface of the bar here shown is required to fit between the head and flange of a rail, and the importance of its function demands that the means best adapted to produce a correct shape with uniformity of size should be sought. In operation it is well understood that it is practically impossible to get that degree of exactness required to make one bar fit another by adjusting the distance between the rolls. The means for such adjustment are comparatively crude in the best designed trains; the spring of the rolls and of the packing between the chocks and brasses, the variation in the temperature of the rolls and the consequent expansion and contraction due thereto, and the difficulties in the

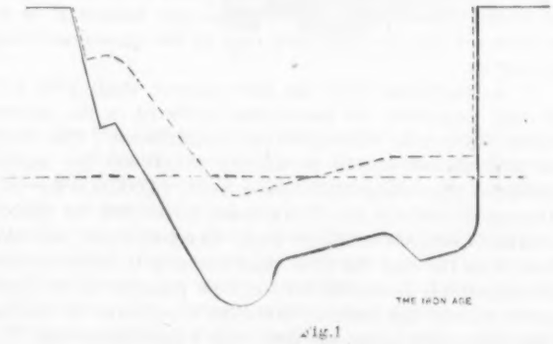


Fig.1

way of accurately gauging the bar making a very nice degree of accuracy by this method generally impracticable, if not impossible. In such cases, whenever possible, such surfaces should be inclosed in one roll in the manner shown by the full line of Fig. 1, and the bar should therefore be made to pass between the rolls in a position having this object in view.

There are, however, exceptional instances, such as Fig. 13, the outside surfaces of which should have the same degree of accuracy and uniformity as Fig. 12, but to set a pass for this bar so that its outer face, including the beveled edge of the short leg, would be inclosed by one roll would put the pass in such a position that the long leg would be set in a very unfavorable situation. This position would bring the long leg between the sides of two collars, which would cause a very considerable end thrust of the rolls, difficult to control. Added to this, the great difference between the diameters of the reducing faces of the pass would make the delivery of the bar from the rolls very erratic, and likely to set up a twisting motion which is often difficult to counteract effectively. This position, Fig. 2, is not impracticable, and should the exigencies of the case require it the draft could be reduced to the least amount for the purpose of

the pass—uniform accuracy in size and shape. Assuming, however, that these can be maintained sufficiently well in a pass set in a position more effective, as far as the work of forming the section goes, we may set it in the position shown in Fig. 4, the details of which form the subject of a separate part of this article.

It will be noticed that the settings of Figs. 1 and 2 are opposite in that one is set with the outside of the

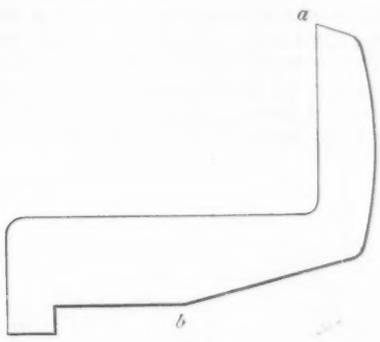


Fig.13

section down and the other up. There are various reasons given for the choice of these positions. With an angular section, such as is shown in these two figures (1 and 2), where one leg is much heavier than the other, it will be found that the bar is generally easier to manipulate with the heavy leg hanging down, although this is unimportant. Sometimes the best position of the pass for adjusting and holding guides in place may determine this point. It is safer as a rule to rest a guide in a groove rather than on a flat or inclined surface without sides, as would be the case if Fig. 1 was inverted. If

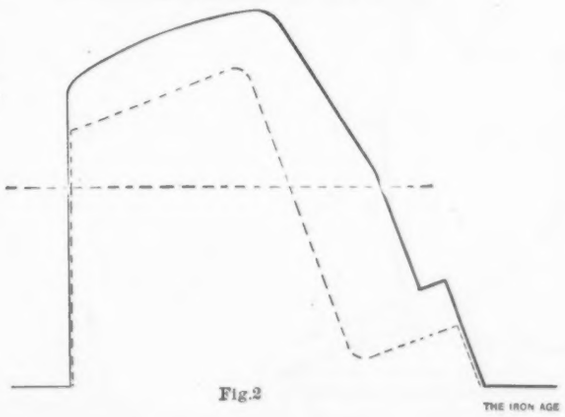


Fig.2

Fig. 2 was set as Fig. 4 the guide would be fitted over the V-shaped collar on the bottom roll and would rest securely there without danger of being pushed off to one side or the other. With the ordinary angle it is generally accepted that the best position is that with the point up, as in this position water and scale readily fall off. In this position the bar has two points of support while resting on the floor or tables and therefore requires less effort on the part of the operator to hold it in position, as he has not to balance it on the point.

As to Guides.

Another consideration in regard to the position of the pass is that its relation to each roll should be such as to require that the guides may be of the simplest character consistent with the proper working and safe delivery of the bar. In rolling a piece of metal, a flat for example, between two straight roll surfaces, there is a tendency for the metal to adhere to one roll or the other and be carried around. To avoid this, guides or strippers are employed, and should the rolls be of equal diameter two guides would be necessary, one on each roll. It is demonstrated in common practice that if the surface of one roll is made to travel a little faster than that of the other, by making it of larger diameter, that roll will free itself from the bar, and that the friction set up by the slipping or rubbing of the larger roll tends to deflect it toward the other roll. It is the common practice, therefore, to make one roll, usually the top, at least one per cent. larger than its mate.

In a close form of pass, having very little taper to its sides, the bar becomes wedged in and held, and unless it is freed from the groove it would be carried around the roll. For this reason a guide is always fitted in the grooved roll, so setting the pass in its relation to the two rolls that the average diameter of the opposing roll will be large enough, comparatively, to free itself and keep the bar bearing on the guide. In some passes guides are more necessary than in others, many cases requiring elaborate arrangements in this respect.

In passes like Fig. 1, under ordinary conditions, it is not likely that the bar will wedge in owing to the considerable taper on the sides. In the instances referred to, the guides are not only made so as to completely inclose the bar, but are made of unusual length to neutralize the twisting motion caused by the unavoidably great difference in the diameters of the pass. In Fig. 1 the

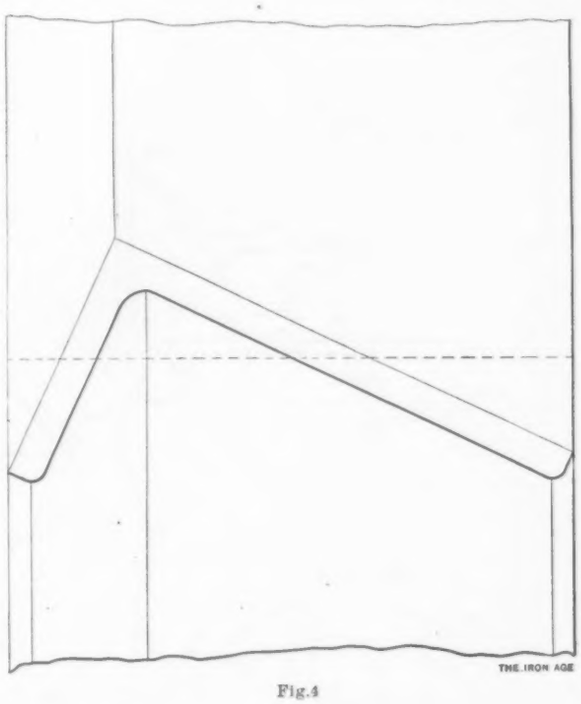


Fig.4

directions of the surfaces of the pass are inclined to the axes of the rolls of different diameter and surface speed, and as the circumference of the face of the working collar or groove varies so will their motion while in contact with the bar vary, the greater circumference having to slip or slide over the surface of the bar the difference between it and the least. This slip has the effect of freeing the roll from the bar, overcoming any tendency of the bar to stick due to the presence of adhesive scale or to roughness of the roll, and if the average diameter of the collar, the face of which is indicated by the dotted lines, is made larger than the other, this roll not only frees itself but keeps the bar bearing steadily against the guide in the lower roll. If we should invert this pass, the bar would be liable to bend down from its own weight after passing beyond the influence of the rolls, which would make it necessary to fit guides on both rolls; but by keeping the pass in the position shown, which is generally assumed to be correct for this section, one guide would be sufficient.

These are the simplest uses of the guide for leading out of the rolls, and are given to illustrate the desirability of exercising care in setting the pass at its proper distance between the axes of the two rolls. There are many functions performed by this indispensable auxiliary, varied and intricate in their application, which require that they shall be well understood and appreciated, and which demand considerable skill in their construction and adaptation to the needs of individual cases.

(To be continued.)

Stock Distribution in the Blast Furnace.

BY JOS. E. BAYSOR AND JOHN J. PORTER, DU BOIS, PA.

The statement that the mechanical advances in blast furnace construction have often been at the expense of metallurgical efficiency has been made by several writers. Recent experience of the authors in comparing the working of old style and modern furnaces leads them to corroborate this statement. Particularly is it true of the introduction of mechanical filling devices, and it is beginning to be realized that they have brought with them a new problem in distribution. With the hand barrow style of filling, where the stock was dumped at four or more points around the hopper, as long as the top fillers were conscientious in their work there was only the distribution from the center outward or radial distribution to be considered, and this was readily controlled by adjusting the size of the bell and hopper, or in special cases by the use of the double ring bell. With the coming of the skip hoist, however, a new phase of the problem presented itself: for, as the stock is dumped from one point, there may be and usually is a segregation of sizes about the circumference of the hopper, which introduces a new problem of circumferential distribution.

Good examples of the troubles which may arise from the existence of this condition are found in the records of three furnaces which have recently come to the authors' notice. Two of these plants have been built within the last two years, and are equipped with a well-known make of skip hoist and double bell charging apparatus. Their metallurgical work, however, has been far from satisfactory. Fuel consumption has been high, output low, product irregular, and, worst of all, the destruction of the linings has been extremely rapid. In one case a hot spot appeared within three months after blowing in, and, persisting in spite of all attempts to grout it up, finally compelled relining after a campaign of 14 months. In the other case the results were still worse, four linings, two partial and two complete, having been put in within two years of the first blowing in. The third furnace is an older plant which had done good work with a top of the four-cylinder type. Recently, however, it was remodeled, and a double bell and hopper top similar to that on the other furnaces was added. The consequences have been unfortunate, for at the present writing, two months after resuming blast, a bad hot spot exists, and the chances for a long campaign look very slim.

The cause of these troubles is that on all of the furnaces the lining failed in nearly the same location, *i. e.*, directly opposite the skip hoist and about 20 feet above the mantle. This leaves but little room for doubt that channeling of the blast caused by faulty distribution did the damage. However, if further proof were wanted it was furnished by an inspection of the action of the skip in dumping and a trip under the lower bell after the furnace had been filled up preliminary to blowing in. This showed conclusively that a slightly greater proportion of the lump was thrown to the side opposite the skip, while more of the fine ore and almost all of the fine coke remained on the same side as the skip, a condition of affairs which could hardly fail to cause channeling.

The reasons for this sizing have been gone into in some detail by David Baker in two recent papers before the American Institute of Mining Engineers, and need not be repeated here. It may not be out of place, however, to call attention to certain fallacies in this connection.

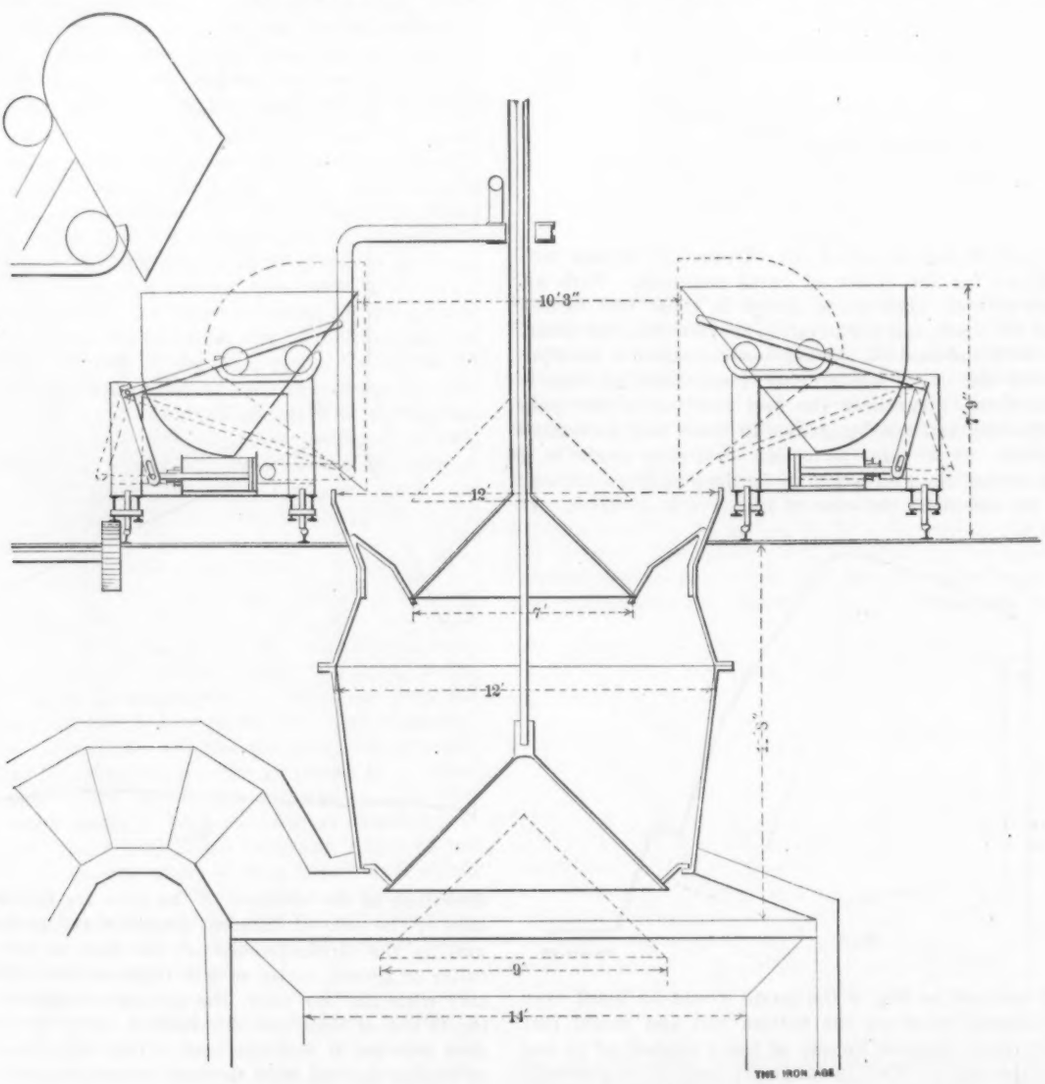


Fig. 1.—Cross Section of a Filling Device for Use with a Double or Single Track Skip Hoist.

First, that because a skip loaded with lump stock, such as limestone, distributes it evenly around the hopper it will necessarily do the same with a mixture of lump and fine. A little thought and observation will show that as the skip loaded with a mixture of lump and fine stock ascends the trestle the finer particles are shaken to the bottom, and when dumped naturally go to that side of the bell which lies directly under the nose of the skip. This is especially noticeable in the coke, the separation of breeze from lump being almost complete. A second fallacy lies in the use of baffles, spreaders, cylinders and auxiliary hoppers to effect circumferential distribution. It should be apparent to any one that if the fine stock is placed on one side of the upper hopper it must drop onto the same side of the lower bell, and consequently into the same side of the furnace, unless shifted around or over the peak of the bell. Hence no device which simply moves the stock to or from the center in a radial line can do more than slightly palliate this evil..

The authors came to the conclusion that no satisfactory results were to be obtained by means of the skip hoist in connection with the stationary hoppers now in use, and realizing also that in view of the large output now demanded of a furnace the skip hoist has become a necessity, have decided that the only solution of the problem lies in the use of some form of rotary hopper or distributer. The Brown rotary distributer is the only existing filling device of this type of which they have heard, and while this appears to give satisfaction where it has been installed, they believe that there is room for more work along this line, and offer the following suggestions, not as complete designs, but as basic ideas, capable of development by our mechanical engineers:

In Fig. 1 is shown a cross section of a filling device intended to be used with the ordinary double or single track skip hoist and to imitate as closely as possible the elasticity and perfect distribution of hand filling. Its essential features consist of a circular revolving frame upon which are mounted four barrows, which may be tilted and their contents emptied into the hopper by means of the cylinders, as shown. In operation the barrows would be brought successively under the skip to be filled with stock, and when all are full dumped simultaneously into the hopper, the gas seal being raised at the time. The revolving of the frame and barrows could be automatically accomplished by a rack and gearing driven from an auxiliary drum on the hoist engine, or from the top sheave of the skip cables; or, if greater flexibility in the manner of filling were desired, the apparatus might be driven by an independent engine or motor.

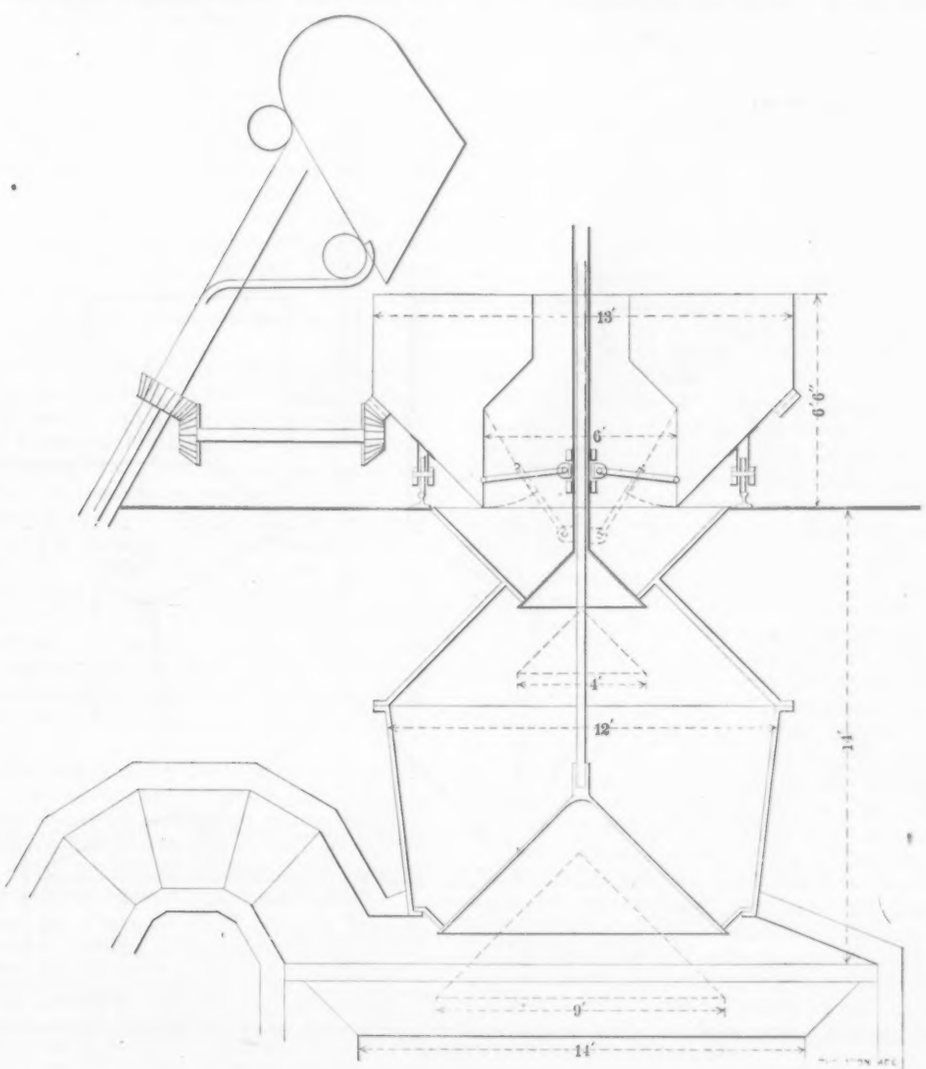


Fig. 2.—Sectional View of a Simpler Device Similar to the One in Fig. 1.

using in this case some form of telltale in the stock house in order to show the position.

In Fig. 2 is shown a sectional view of a considerably simpler device of the same general type. In place of the frame with barrows a revolving annular hopper is here used, the sides of which are at such an angle as to discharge the stock by gravity. The hopper is divided into four pockets by radial partitions, and each pocket is closed at the bottom by a hanging door opening out over the small bell. These doors are attached by levers to a loose collar on the small bell rod, the effect being that when the small bell is lowered the doors open and allow the stock in the hopper to fall through upon the large bell.

To allow the removal of the large bell the revolving hopper would be made in sections bolted together, the upper part of the bell hopper being also removable. A trolley hoist or jib crane would be installed, and by its use the bell could be easily gotten at and removed.

The operation of this device would be much the same

as the preceding, the four pockets of the hopper being brought successively under the skip trestle and each receiving a skip load of stock. This is then discharged on the large bell by lowering the small bell. As in the former case, the revolving of the hopper could be accomplished automatically or by independent motive power used in connection with a telltale below or an operator stationed on top.

Fig. 3 shows a modification of the preceding design in which the doors are omitted and a shield or inverted bell takes the place of the small bell. In this form an annular opening is left at the bottom of the inside circumference of the hopper, this being closed by the cylindrical portion of the shield when in its lowered position; while when the shield is raised the stock would fall on

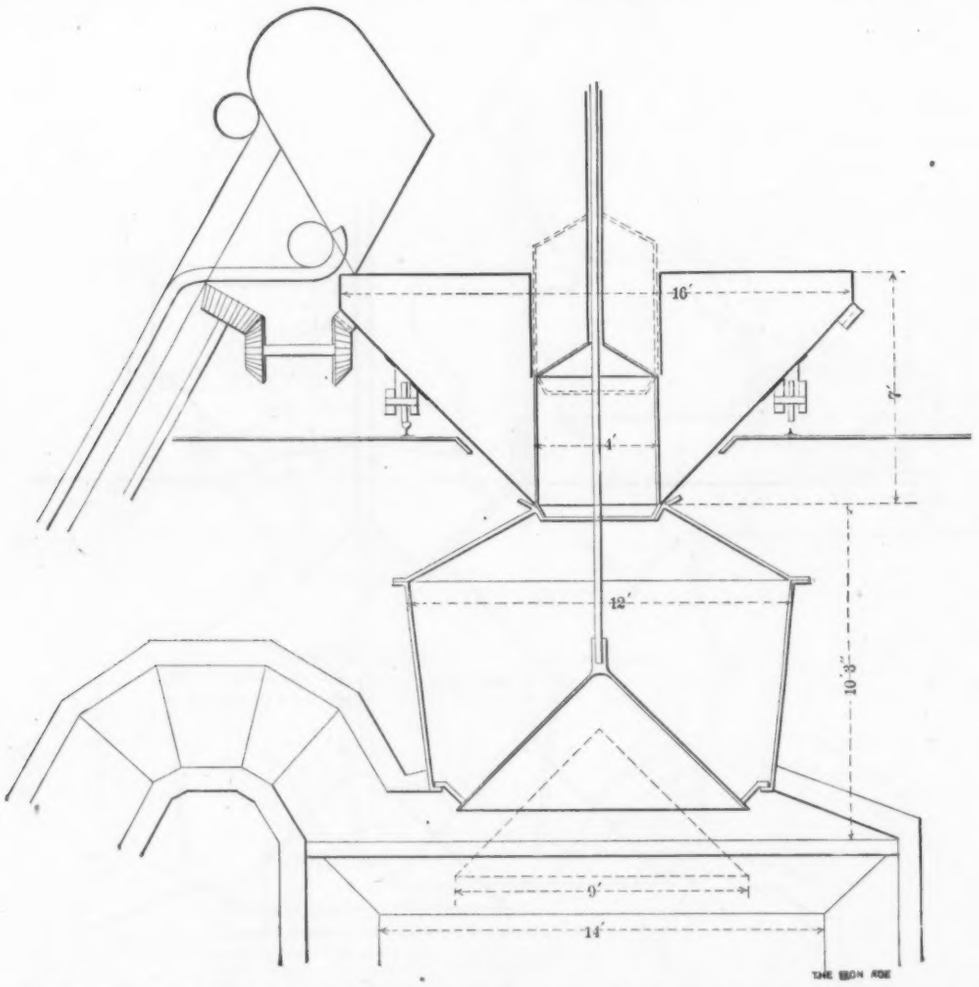


Fig. 3.—Modification of the Design Shown in Fig. 2, with Doors Omitted and the Small Bell Replaced with an Inverted Bell or Shield.

the large bell. In other respects the construction of this device would be the same as in the other cases.

Still further modifications of the method of emptying the revolving hopper might be suggested, such as the use of a seal or shield in connection with doors and levers, or the use of a cylindrical shield which would lower instead of rise. These, however, are less practicable than the ideas already outlined.

In conclusion the writers claim that as compared with the stationary hopper the revolving hopper type of filling device gives perfect circumferential distribution, better control of filling and the possibility of a greater variety of methods of filling. The disadvantages are of course the greater complication and cost. As compared with the Brown distributer the weight and hence first cost would probably be somewhat more, but, on the other hand, the ready accessibility of the mechanism and the fact that all moving parts are above the gas seal away from heat and dust are very important advantages.

Judge Waite of the Board of United States General Appraisers rendered a decision January 9 denying the free admission of molders' patterns. The case hinged specifically on the importation of wooden molders' patterns by R. Hoe & Co., New York, for use in manufacturing machinery as previously set forth in these columns.

The Career of Sir Lowthian Bell.

The following tribute to the memory of the late Sir Lowthian Bell, received from our London correspondent, will be read with deep interest on both sides of the Atlantic:

Some of the qualities which most directly contributed to the development of the British Empire are reflected in the life record of Sir Lowthian Bell, and his death removes a notable figure from the ranks of British iron masters. He had outlived almost all his contemporaries, and to the last he had retained his connection with the great iron making concerns which he had done so much to build up.

He was born in 1816, the eldest son of Alderman Thomas Bell of Newcastle-on-Tyne, and he started out with an excellent education, received not only in Newcastle but also in France, Germany and Denmark, followed by a course at the Edinburgh University, which admirably equipped him, both intellectually and technically, for the great expansion of enterprise and industry which in his early manhood resulted from the great free trade reforms. The breadth of view and energy then gained distinguished him to the end of his long and active life. His foreign education led him to realize that it was possible to learn much from the foreigner, and prevented him from sharing the wholesale contempt with which at that period many English firms looked upon anything approaching Continental methods. He set great value upon the scientific training he had received abroad, upon the importance of his knowledge of three foreign languages, and was always ready to re-

ceive a new idea or to devote time, talent and money to the testing of suggested improvements.

After his father's death in 1845 he and two brothers succeeded to the family interest in the firm of Loch, Wilson & Bell of Walker-on-Tyne. By that time Isaac Lowthian Bell, as he was then known, had made himself recognized as a manufacturer intent on utilizing scientific discovery and knowledge in the direction of industrial enterprise. He had built a furnace in which ironstone from the Yorkshire coast was being successfully smelted, and in partnership with his two brothers had established the independent firm of Bell Brothers, which, on the discovery of ironstone at Eston, closely linked its interests with the Cleveland district. In 1854 Port Clarence, on the Durham side of Middlesbrough, was selected as a site for new iron works, three furnaces were blown in, and an auspicious start was made with the enterprise which has for many years enjoyed a world-wide fame. In the first year 12,536 tons of iron were made, and two years after this output was nearly doubled. By and by the lease of a large tract of ironstone on an estate at Skelton was acquired, and this development led to the opening up of the district by a railroad line to Loftus. Next, important collieries in Durham were secured, and then followed a substantial enlargement of the Port Clarence Works, supplied with plant adapted to the latest scientific methods and processes elaborated by the late Mr. Vaughan (of Bolckow, Vaughan & Co.) and by Isaac Lowthian Bell himself.

The success of two large furnaces, 89 feet high and 16 feet in diameter, which he built in 1865 to satisfy his own theories—the outcome of his persistent study and observation—largely increased his authority among the pioneers of iron making. A great impetus to trade was given at the close of the Franco-German War. In four years the product of the Port Clarence Works was more than doubled, having risen from 88,470 tons in 1868 to 136,997 tons in 1871. Since then its growth has been slower, and there have been ebbs as well as flows in the trade, but it can be said that the Port Clarence Works and the firm of Bell Brothers have never lacked prosperity when it was enjoyed anywhere else in the district. The chief explanation is to be found in the sustained intelligence with which the works have always been carried on.

Isaac Lowthian Bell was always concerned to put his knowledge into practice, always concerned that the plant and the processes should be modernized so that the largest and best results might be obtained at the lowest possible cost. In a recent account of the works this illustration of the superiority of modern methods was given:

> Forty-five years ago a furnace which produced 150 tons a week was regarded as fulfilling all the reasonable expectations of the ironmaster. Now 100 tons a day is looked upon as a quantity below which a furnace ought not to fall, and as much as 913 tons a week has been obtained from one of the Clarence furnaces. These figures are much smaller than those obtained in America, but it would probably be found that, if the amount of pig iron made per pound sterling of capital invested in an American furnace and in a Cleveland furnace were compared, the comparison would not be unfavorable to the Cleveland furnace.

Not a little of his success was due to his personal studies and the practical demonstration of the utility of his theories which he was able to make at Port Clarence. Even when an old man, with the cares of his huge business pressing heavily upon him, he kept himself in close touch with the latest and best scientific work. At the meetings of the Iron and Steel Institute his papers were always found worthy of careful and serious consideration, and, when over 70 years of age, he published a monograph on the "Chemistry of the Blast Furnace," the result of elaborate experimental observations. Then, again, he kept in touch with the developments of the iron trade in other countries, and in 1873, when the members of the Iron and Steel Institute visited Belgium, Sir Lowthian Bell contributed an address in French, in which he exhaustively examined the conditions and prospects of the iron industries of Belgium and England.

A student himself, he was always a generous friend to education and took a keen interest in the establishment of the College of Science in Newcastle, in affiliation with the University of Durham. He provided with no grudging hand for the education of the children of his workmen, and his eldest son, now Sir Hugh Bell, has distinguished himself as a promoter of elementary, technical and university education. To have his workmen well educated, well housed, contented and faithful was ever the desire of Isaac Lowthian Bell. Some years ago abundant evidence of the success of these endeavors was afforded at the jubilee celebrations of the firm, when a return of service of the different workmen was published. Another manifestation of his kindly and helpful interest was the establishment of a savings bank for his employees, by which their surplus earnings could secure without risk an interest much larger than they could safely get elsewhere.

Nor did he neglect his duties as a citizen. He took a leading part in the municipal and political life of Newcastle, holding the office of Mayor on two occasions. In 1874 he was returned as Liberal member of Parliament for the Borough of Hartlepool, and continued to represent the town till 1880. His baronetcy was conferred upon him in 1885, in recognition of his great services to the State. He served on the royal commission appointed to inquire into the causes of depression of trade, and formed one of the commission which proceeded to Vienna to negotiate free trade in Austria-Hungary. He was director of the Northeastern Railway Company since 1865, and also of the private Cleveland Railway. At the time of his death he was the oldest railroad director in the Kingdom.

For his scientific work he was honored by many of the learned societies of Europe and America. He was Fellow of the Royal Society, Hon. D.C.L. of Durham University, LL.D. of the universities of Edinburgh and Dublin and D.Sc. of Leeds University. He was one of the founders of the Iron and Steel Institute, which came about in this way. Ironmasters and manufacturers had been in the habit of meeting from time to time at Newcastle and having papers read to them relating to their business. It was thought that an organization which would be international might be established, and in 1868 those who looked with favor on the idea met at his house to talk it over. As an outcome of that meeting the Iron and Steel Institute was formed and Isaac Lowthian Bell was its third president. In 1874 the Institute bestowed upon him its first Bessemer medal for his distinguished contributions to the science of iron making. He was also awarded the gold medal of the Society of Arts.

He earned great repute as an author, and was a prolific writer on technical and commercial questions relating to the iron and steel industries. His first important book, published in 1872, entitled "Chemical Phenomena of Iron Smelting," created no small stir in the metallurgical world and became a practical textbook which has proved of the greatest utility to students of pig iron making. It was a monument of patient research, invaluable to all practical men. He also published "The Principles of the Manufacture of Iron and Steel," a large and important book; "The Iron Trade of the United Kingdom Compared with Other Chief Iron Making Nations," the official report relating to iron and steel industries for the Centennial Exhibition at Philadelphia, and numerous papers and pamphlets. He died within a few weeks of completing his eighty-ninth year, and leaves the scientific, no less than the commercial, world considerably poorer for his decease.

A dispatch from St. Johns, N. F., states that Sir Alfred Harmsworth, Leicester Harmsworth, Harold Harmsworth and Miles Berton of London, England, have incorporated the Anglo-Newfoundland Development Company, with a capital stock of $5,000,000, for the manufacture of pulp and paper. It is understood that large properties on the island have been acquired.

The report that the National Tube Company, Pittsburgh, contemplates making large additions to the new plant under way at Lorain, Ohio, is untrue. Only the present work now being done at Lorain will be carried out and no new additions are contemplated.

Fluctuations in the Prices of Raw and Finished Materials.

(With Supplement.)

We present in the accompanying colored diagram the fluctuations in the prices of raw and finished iron and steel for the period of 1896 to 1904, both inclusive. It shows at a glance the relations between the prices of pig iron of different grades in leading distributing centers and a long series of semi-finished and finished products:

Months.	Bessemer pig.	Steel Billets.	Southern No. 2 foundry.	Local No. 2 foundry.	Cut nails.	Steel tank plate.	Beams.	Bar iron.	Wire nails.
1896									
Jan.	12.00	16.80	11.20	13.55	2.00	1.43	1.60	1.23	2.25
Feb.	12.63	17.38	11.00	12.50	2.00	1.40	1.50	1.24	2.25
March	12.32	17.09	10.75	12.00	2.15	1.40	1.55	1.23	2.40
April	13.10	19.53	10.40	12.00	2.21	1.44	1.60	1.18	2.46
May	12.64	19.50	10.50	11.69	2.30	1.45	1.68	1.20	2.55
June	12.35	19.12	10.32	11.50	2.30	1.40	1.70	1.20	2.55
July	11.88	18.85	9.75	11.25	2.30	1.38	1.76	1.20	2.55
Aug.	10.95	18.75	9.37	11.18	2.30	1.35	1.70	1.21	2.55
Sept.	11.25	19.75	9.50	10.75	2.30	1.31	1.70	1.20	2.55
Oct.	11.62	19.75	9.95	10.88	2.30	1.27	1.70	1.20	2.55
Nov.	12.05	20.00	10.44	11.19	2.09	1.25	1.70	1.20	2.29
Dec.	11.24	17.50	10.35	11.25	1.41	1.23	1.62	1.15	1.51
1897									
Jan.	10.56	15.42	10.00	11.02	1.28	1.20	1.70	1.15	1.39
Feb.	10.60	15.25	9.75	11.00	1.25	1.20	1.70	1.15	1.35
March	10.52	15.44	9.69	10.88	1.25	1.20	1.70	1.14	1.40
April	9.82	14.60	9.25	10.75	1.25	1.20	1.70	1.15	1.40
May	9.32	13.82	8.75	10.38	1.23	1.11	1.49	1.10	1.35
June	9.56	14.06	8.75	10.25	1.23	1.10	1.25	1.07	1.31
July	9.25	14.00	8.95	10.25	1.20	1.10	1.15	1.08	1.25
Aug.	9.33	14.00	9.00	10.25	1.19	1.08	1.15	1.08	1.25
Sept.	10.09	15.60	9.35	10.40	1.19	1.14	1.15	1.14	1.41
Oct.	10.45	16.44	9.50	11.00	1.28	1.15	1.20	1.19	1.49
Nov.	10.23	15.57	9.50	11.00	1.14	1.14	1.20	1.20	1.41
Dec.	10.01	15.00	9.50	11.00	1.12	1.13	1.20	1.15	1.39
1898									
Jan.	9.87	14.93	9.50	11.00	1.10	1.10	1.30	1.11	1.42
Feb.	10.05	15.06	9.25	10.93	1.10	1.10	1.30	1.11	1.45
March	10.39	15.25	9.25	10.75	1.10	1.08	1.30	1.06	1.43
April	10.41	15.06	9.25	10.91	1.08	1.12	1.30	1.05	1.31
May	10.30	14.85	9.37	11.00	1.08	1.21	1.30	1.05	1.31
June	10.34	14.65	9.30	11.00	1.06	1.23	1.30	1.05	1.35
July	10.25	14.50	9.25	11.00	1.06	1.20	1.30	1.00	1.31
Aug.	10.35	15.85	9.37	11.00	1.05	1.23	1.37	1.06	1.26
Sept.	10.78	16.00	9.55	11.00	1.08	1.27	1.40	1.14	1.32
Oct.	10.36	15.56	9.75	11.00	1.10	1.27	1.38	1.13	1.33
Nov.	10.15	15.06	9.75	11.00	1.10	1.25	1.35	1.10	1.28
Dec.	10.58	15.80	9.90	11.00	1.10	1.26	1.35	1.11	1.27
1899									
Jan.	10.87	16.62	10.31	11.12	1.18	1.35	1.40	1.15	1.43
Feb.	11.60	18.00	11.69	12.12	1.32	1.55	1.42	1.20	1.57
March	14.59	24.30	13.75	14.60	1.48	1.89	1.55	1.41	1.94
April	15.03	25.37	14.50	15.12	1.67	2.18	1.64	1.50	2.05
May	16.20	26.75	14.56	15.37	1.65	2.23	1.63	1.56	2.10
June	18.51	30.10	16.00	17.60	1.97	2.48	1.82	1.81	2.30
July	20.65	33.12	17.56	18.87	2.12	2.58	2.08	2.00	2.42
Aug.	21.75	35.40	18.35	20.30	2.20	2.72	2.20	2.00	2.50
Sept.	23.43	38.37	19.94	21.87	2.45	2.92	2.40	2.05	2.76
Oct.	24.18	38.75	20.75	23.00	2.50	3.00	2.40	2.13	2.87
Nov.	24.78	36.50	20.75	23.10	2.48	2.87	2.40	2.21	2.95
Dec.	24.90	33.75	20.75	23.50	2.45	2.48	2.40	2.20	2.95
1900									
Jan.	24.90	34.50	20.69	23.50	2.50	2.38	2.40	2.20	3.20
Feb.	24.80	34.87	20.50	23.50	2.50	2.32	2.40	2.20	3.20
March	24.72	33.00	20.30	23.50	2.50	2.10	2.40	2.18	3.20
April	24.70	32.00	20.19	23.37	2.50	2.02	2.40	2.12	2.95
May	21.00	28.90	19.75	22.30	2.05	1.75	2.40	1.77	2.20
June	19.72	27.25	18.75	20.37	2.05	1.60	2.22	1.56	2.20
July	16.75	21.00	16.81	18.25	1.97	1.37	2.05	1.33	2.20
Aug.	15.60	18.20	14.25	15.90	1.95	1.30	1.89	1.28	2.20
Sept.	13.87	16.93	13.62	15.00	1.95	1.25	1.65	1.30	2.20
Oct.	13.06	16.50	12.87	14.50	1.95	1.21	1.65	1.28	2.20
Nov.	13.48	18.95	12.95	14.50	1.95	1.44	1.65	1.28	2.20
Dec.	13.43	19.75	13.75	14.75	1.95	1.54	1.65	1.42	2.20
1901									
Jan.	13.15	19.75	13.45	14.75	1.95	1.55	1.65	1.44	2.22
Feb.	14.43	20.31	13.12	14.25	2.05	1.55	1.63	1.35	2.30
March	16.31	22.88	14.00	15.25	2.01	1.62	1.66	1.35	2.30
April	16.75	24.00	14.50	15.50	2.00	1.76	1.75	1.47	2.30
May	16.30	24.00	13.85	15.50	2.00	1.78	1.75	1.51	2.30
June	16.00	24.38	13.37	15.00	2.00	1.75	1.75	1.55	2.30
July	16.00	24.00	13.00	15.00	2.00	1.75	1.75	1.55	2.30
Aug.	15.75	24.20	13.00	15.00	2.00	1.75	1.75	1.56	2.30
Sept.	15.75	24.88	13.06	15.00	2.05	1.75	1.75	1.61	2.30
Oct.	15 89	26.70	13.75	14.75	2.04	1.75	1.75	1.62	2.28
Nov.	16.00	27.00	14.00	14.88	2.05	1.75	1.75	1.64	2.17
Dec.	16.31	27.50	14.25	15.50	2.05	1.75	1.75	1.65	1.99
1902									
Jan.	16.70	27.50	14.55	15.90	2.05	1.78	1.75	1.66	1.99
Feb.	16.93	29.37	14.75	16.50	1.95	1.78	1.75	1.68	2.05
March	17.37	31.25	14.75	18.16	1.95	1.78	1.85	1.84	2.05
April	18.75	31.50	16.87	18.62	1.96	1.81	1.90	1.92	2.05
May	20.75	32.20	18.35	20.50	2.05	1.95	1.99	1.96	2.05
June	21.56	32.37	20.19	21.50	2.05	2.00	2.11	1.99	2.05
July	21.60	31 75	20 75	21.25	2.05	2.00	2.27	1.95	2.05
Aug.	21.62	31.06	23.06	21.75	2.05	2.00	2.21	1.93	2.05
Sept.	21.75	29.50	25.00	23.00	2.05	2.00	2.10	1.92	2.03
Oct.	21.75	29 70	25.65	23.00	2.05	2.06	2.09	1.93	1.89
Nov.	21.68	28.50	23.62	23.00	2.05	2.10	2.00	1.87	1.85
Dec.	21.75	29.12	22.44	23.00	2.05	2.10	1.97	1.92	1.85
1903									
Jan.	22.15	29.60	21.65	23.10	2.07	2.10	1.78	1.93	1.89
Feb.	21.45	29.87	21.50	23.00	2.10	2.05	1.75	1.93	1.92
March	21.85	30.62	21.37	22.87	2.10	1.94	1.75	1.94	2.00
April	21.28	30.25	20.15	22.52	2.15	1.85	1.74	1.93	2.00
May	20.01	30.37	18.87	20.37	2.15	1.80	1.73	1.86	2.00
June	19.72	28.87	17.75	19.50	2.15	1.78	1.73	1.79	2.00
July	18.89	27.60	16.15	17.90	2.15	1.77	1.73	1.69	2.00
Aug.	18.35	27.00	15.19	16.87	2.15	1.78	1.73	1.60	2.00
Sept.	17.22	27.00	14.75	16.06	2.15	1.78	1.73	1.60	2.00
Oct.	16.05	27.00	13.50	15.35	2.15	1.78	1.73	1.50	2.00
Nov.	15.18	24.00	12.00	14.75	1.90	1.78	1.73	1.40	1.97
Dec.	14.40	23.00	12.05	14.46	1.90	1.77	1.73	1.35	1.87
1904									
Jan.	13.91	23.00	12.37	14.12	1.77	1.74	1.74	1.35	1.89
Feb.	13.66	23.00	12.12	13.56	1.70	1.74	1.74	1.36	1.90
March	14.25	23.00	12.10	13.70	1.72	1.74	1.74	1.45	1.91
April	14.18	23.00	12.50	14.00	1.74	1.74	1.74	1.48	1.90
May	13.60	23.00	12.25	13.50	1.75	1.74	1.74	1.48	1.90
June	12.81	23.00	11.80	13.35	1.75	1.74	1.74	1.48	1.90
July	12.40	23.00	11.81	13.25	1.72	1.74	1.74	1.48	1.89
Aug.	12.81	23.00	12.00	13.25	1.65	1.74	1.74	1.48	1.71
Sept.	12.63	20.00	12.00	13.50	1.60	1.58	1.58	1.45	1.60
Oct.	13.10	19.50	12.81	13.75	1.60	1.54	1.54	1.43	1.60
Nov.	14.85	20.25	15.19	15.63	1.62	1.54	1.54	1.47	1.62
Dec.	....	....	15.85	....	1.73	1.58	1.58	1.60	1.73

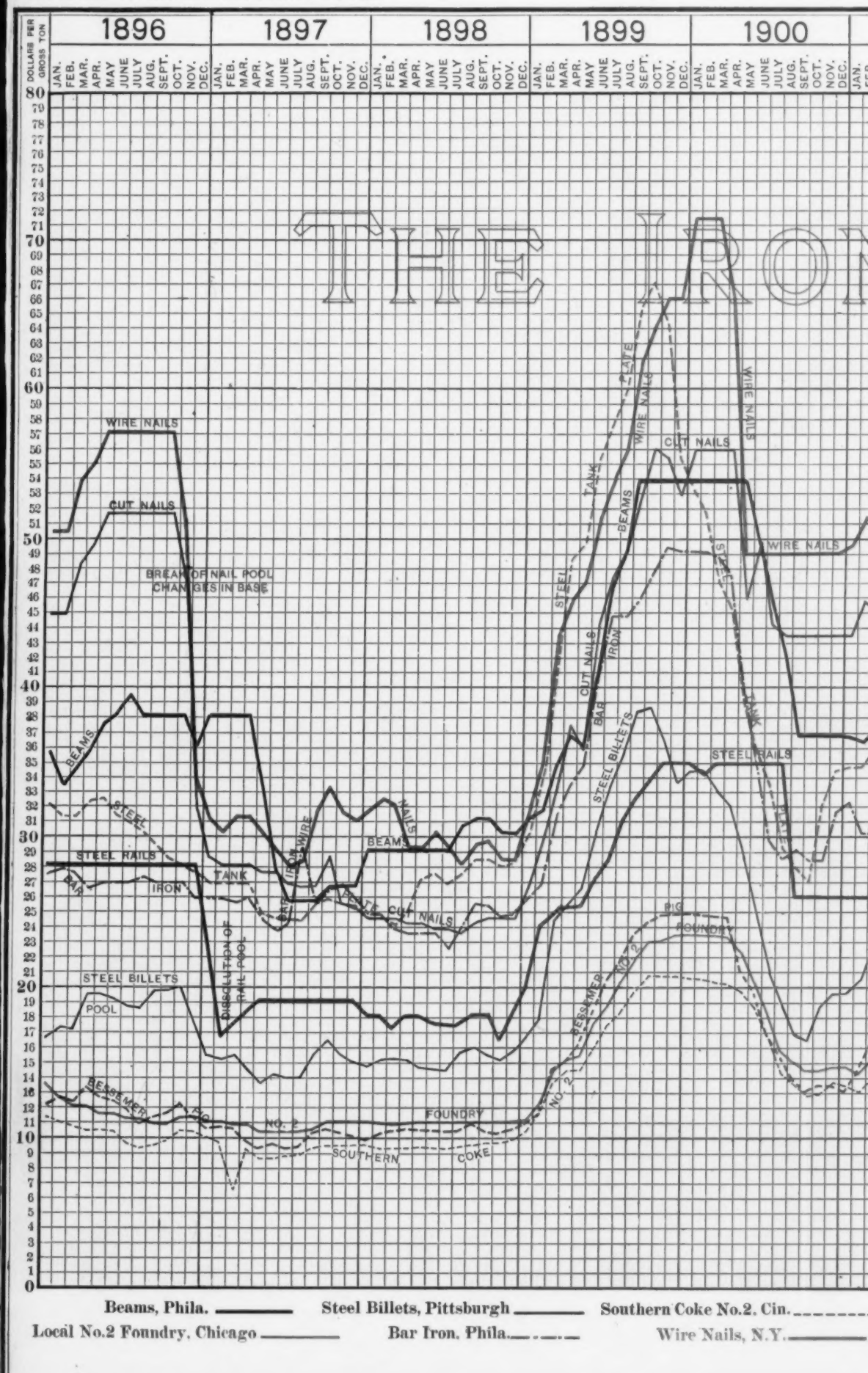
In plotting the prices for finished materials the figures have been converted from the price in cents per pound as given in the above tables to the price in dollars per gross ton, so as to make it possible to refer them directly to the prices for pig iron and for steel billets.

The Coosa Pipe & Foundry Company, Gadsden, Ala., has been organized, with a capital stock of $50,000, to manufacture soil pipe and fittings. A new plant with an annual capacity of from 10,000 to 20,000 tons of finished product will be erected, the construction of which has already begun, with the expectation of completing the work before March 1. The officers are: President, T. G. Bush, president of the Alabama Consolidated Coal & Iron Company; vice-president, G. B. McCormick; secretary and treasurer, H. Hammond, and general manager, M. W. Bush.

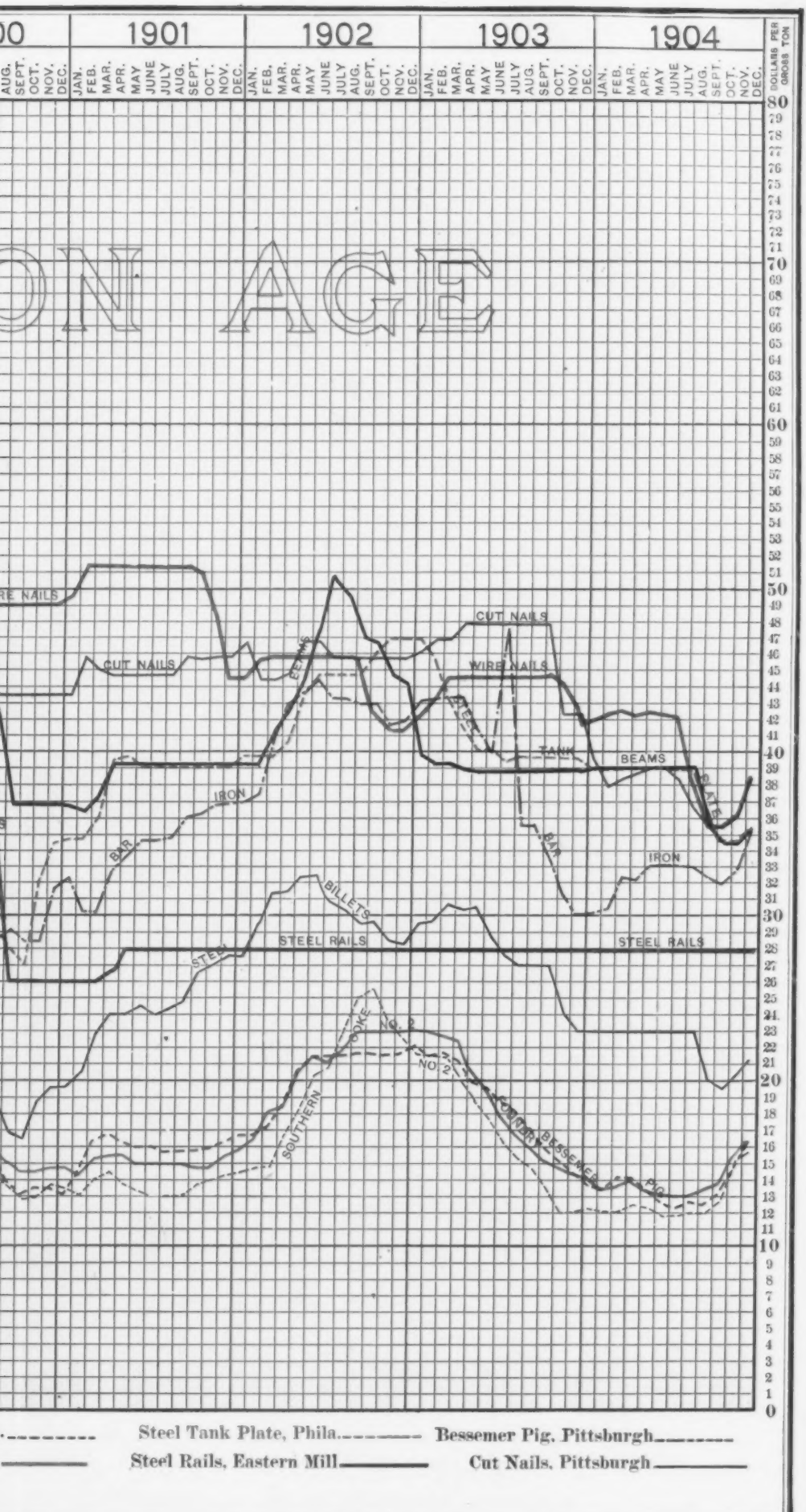
A. H. Quinn of Anniston, Ala., has purchased from the receivers of the Southern Car & Foundry Company the charcoal furnace at Gadsden, known as Coosa Furnace, and will organize the Quinn Furnace Company to operate it. The stack will be repaired and placed in operation as soon as possible. Mr. Quinn has charge of valuable ore and lime properties in the vicinity of the plant.

The Goulds triplex boiler feed pump, driven by a 40 horse-power electric motor, used in the boiler house of Machinery Hall, at the World's Fair, St. Louis, has been purchased by the Lewis and Clark Exposition Company to be applied to the same purpose at the exposition to be held in Portland, Ore., next year. The Goulds Mfg. Company, Seneca Falls, N. Y., built this pump, which supplied feed water for 4000 horse-power of boilers.

In a recent letter to the London *Economist*, J. H. Curle, the correspondent of that paper, says of the future of the Rand gold mines: "I may again say that I expect the blanket beds of the Transvaal will yield a thousand millions sterling; that some day there will be 15,000 stamps at work on the Rand, crushing 25,000,000 tons a year, and that the yield of gold from this, at a recovery of 33s. a ton, would reach the great figure of £41,250,000."



Fluctuations in the Prices of Crude a
from January 1, 1896, to J



de and Finished Iron and Steel
to January 1, 1905.

Proposed Flagler Steel Works.

Harvey K. Flagler, who has been prominently connected with the pipe and tube industries of the country for many years, is president of a company newly formed whose purpose it is to erect a pipe and tube plant in Lake County, Ill., about 28 miles from Chicago. The company, known as the Flagler Iron & Steel Company, has bought 200 acres of land adjoining Rondout, a station on the Milwaukee Division of the Chicago, Milwaukee & St. Paul Railroad, and has purchased from Mr. Flagler 461 acres of iron ore property in Marquette County, Mich., adjoining the property of the Republic Iron Company. The Flagler holding is what is known as the Kloman mines, and is stated to be rich in Bessemer ore of a high grade. It is the purpose of the Flagler Iron & Steel Company to sink shafts and begin the production of ore immediately, and to erect such buildings and purchase such machinery and equipment as are necessary for mining on a large scale.

The proposed steel works at Rondout, which, by the way, is to be rechristened "Flagler," are to comprise blast furnaces, Bessemer steel works, rolling mill and pipe and tube mills, and the company's charter permits it to engage in the manufacture and sale of billets, blooms, bars, beams and such other forms of iron and steel as it may elect. The present plan is to limit the finishing mills to those for the production of tubular goods, and to add other products at a later date. The Rondout plant is estimated to require an immediate outlay of $1,000,000. The intention of the company is to start with a mill that will produce about 250 tons of pipe and tube a day, and it is obtaining estimates on suitable buildings and equipment for a plant of this size. The factory site is on the main line of the Chicago, Milwaukee & St. Paul Railroad, which road affords direct connection with the company's mine, permitting the transfer of ore by all rail from Republic at a low rate. Rondout, or Flagler, as it is to be called, is also on the Elgin, Joliet & Eastern Railroad, commonly known as the "outer belt" line, by which connection is made with all the roads entering Chicago, and with lake port of Waukegan.

It is not known just what Eastern financial forces, if any, are back of Mr. Flagler, or whether his company will depend wholly on the sale of its stock for constructing and working capital. Its prospectus states that its capital stock is $5,000,000, of which 30,000 shares are 7 per cent. cumulative preferred stock and 20,000 shares common stock. The Hibernian Banking Association, Chicago, is the trustee. Many officials of the Chicago, Milwaukee & St. Paul Railroad are interested in the project as individuals, but whether it is backed by the road itself is not known. Options have been secured on several thousand acres of land adjoining the site of the works, and efforts are being made to secure the location there of locomotive and car works and other plants that consume iron and steel in large quantities, and to establish there an industrial city.

The officers of the Flagler Iron & Steel Company are as follows: H. K. Flagler, president; W. P. Dickinson, a banker of Geneva, Ill., first vice-president and treasurer; John Claney, a Chicago lumber merchant, second vice-president; R. Dorothy, a merchant of Pierre, S. Dak., third vice-president; William Dickinson, secretary; O. Nelson, assistant secretary. The four first named officers are also members of the Board of Directors, the other three directors being Geo. E. Simpson, superintendent transportation Chicago, Milwaukee & St. Paul Railroad; Franklin H. Head, and F. A. Helmer, all of Chicago. The legal affairs of the company are in the hands of Helmer, Moulton & Whitman and Howard O. Sprogle, Chicago. The company's offices are in the First National Bank Building, Chicago.

The law of Georgia making the initial carrier of merchandise shipped in that State responsible for damages thereto, even though it occurred on other lines and outside the State, has been held by the United States Supreme Court to be an interference by the State in the regulation of interstate commerce, and therefore unconstitutional and void.

The Illinois Manufacturers' Association.

The Illinois Manufacturers' Association held its annual meeting and dinner at the Auditorium, Chicago, Friday evening, January 6. More than 400 members and guests were in attendance. Addresses were delivered by Levy Mayer, attorney for the association, and by Dr. Frank Gunsaulus, president of Armour Institute. Mr. Mayer's address was on the subject of railroad rates and Government regulation of railroads. He contrasted freight tonnages and freight earnings for the years 1898 and 1903 to show that during the five-year period freight tonnage had greatly increased and the rates, instead of decreasing with the increased tonnage, had increased out of proportion to the expense. From these figures he argued-that rates, rather than being increased as was proposed by the uniform bill of lading proposition, should be decreased. Said he: "No State machinery has yet been devised or, in my opinion, can be devised that can regulate or control the railroads. The Interstate Commerce Commission has done more good than is generally conceded, but it has lacked the final power of judgment and execution. It is permitted to say that rates are too high, but is denied the power of saying what they shall be. The Interstate Commerce Commission should be empowered to enter a judgment as to what a fair rate is and to enforce that rate."

Dr. Frank Gunsaulus, president of Armour Institute, delivered a stirring address, which was frequently punctuated by applause, in which he told of the importance of technical education to the youth of this and future generations and expressed the belief that on the technically educated man would depend the solution of such great questions as the one that had just been presented by the previous speaker and would be powerful in stemming the tide of socialism, that was gaining ground at an alarming rate. He said: "The relation between the technical school and the shop is becoming every day more intimate and we all hope that the day may come when the graduate from our schools may step into your shops without an apology. It keeps technical schools busy now to keep up with the advances made in your factories. The Franklins and Edisons of the scientific world today were not technical graduates, but the moment the young man has learned how to think with his head and work with his hands in a technical school he is ready to step into your factory, where he reaches one hand into the past and one into the future and applies history and theory to the practical problems before him. There are to-night 180,000 men sitting in grimy engine rooms, with oily fingers and perspiring brows, writing out lesson papers for the various corresponding schools, and 30,000 men at this moment are working on examination papers for Armour Institute, including New Zealand, South Africa, Japan and every corner of the earth. We must take the school to the people because the people cannot come to the school. We must employ all agencies to convince the man that the best in him can be developed by applied science."

A vote of thanks was extended to the retiring president, John H. Pierce. The new officers of the association for 1905, whose election was ratified at this meeting, are as follows: President, John E. Wilder, Wilder & Co., Chicago; first vice-president, U. G. Orendorff, Parlin & Orendorff Company, Canton; second vice-president, W. W. Willits, Adams & Westlake Company, Chicago; treasurer, J. Harry Selz, Selz, Schwab & Co., Chicago. Directors, John H. Pierce, Big Creek Coal Company, Kewanee; Bernard A. Eckhart, Eckhart & Swan Milling Company, Chicago; W. B. Conkey, W. B. Conkey Company, Chicago; Wm. Duff Haynie, Illinois Steel Company, Chicago; S. E. Bliss, Bliss & Laughlin, Harvey; Frank H. Madden, Reid, Murdock & Co., Chicago; C. H. Smith, Western Wheeled Scraper Company, Aurora; Geo. D. Roper, Eclipse Gas Stove Company, Rockford; W. D. Brereton, Monmouth Pottery Company, Monmouth; L. W. Noyes, Aermotor Company, Chicago; A. B. Dick, A. B. Dick Company, Chicago.

THE IRON AGE

1855—1905.

New York, Thursday, January 12, 1905.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.

The Iron Age Index.

The index to the reading matter of Volume 74 of *The Iron Age*, for July 1 to December 31, 1904, has been compiled and printed, and will be mailed to those subscribers of *The Iron Age* who will make application for it.

To relieve those who bind or file *The Iron Age* of the trouble of future applications for the semiannual index, we have a special list to whom the index is forwarded without further notice. Subscribers who desire to be entered upon that list will kindly so advise us.

Two Grand Prizes.

In the words of the Jury of Awards of the Louisiana Purchase Exposition a Grand Prize has been awarded to *The Iron Age* for publication, and a second Grand Prize has been awarded to the David Williams Company "for *The Iron Age* and other publications." There are two distinct awards, *The Iron Age* sharing and being specially named in the general award to the publications of the David Williams Company.

We need hardly state that we announce this further triumph for *The Iron Age* with pride and satisfaction, since it rounds out an unbroken record of progress. At the first exhibition at which *The Iron Age* participated—that of Paris, in 1878—a silver medal was awarded. In 1889, at Paris, a like award was made. In 1893, at Chicago, the phrasing of the award was very emphatic. In 1900 *The Iron Age* received a gold medal at Paris, and now, at St. Louis, it has reached the Grand Prizes.

Pig Iron Costs in Western Germany.

Some interesting estimates with reference to the cost of manufacture of pig iron in Western Germany have been brought out in the course of a controversy over a proposed Rhine Hanover canal, in which the southwestern group of the Association of Iron Makers took a hand. This body has put forward some figures which it may be of interest to quote, with the understanding that they are based upon market prices for fuel and ore and not the figures of cost of materials to those works which own their own collieries or ore mines.

Taking Westphalia as the basis, the price of coke by the coke syndicate is 15 marks, to which must be added 1 mark for freight. The consumption of coke per metric ton in smelting the ores, which carry from 50 to 60 per cent. of iron, is from 900 to 1000 kg. Taking 950 kg. as an average, the cost, including 15.20 marks freight per ton of pig iron, would be as follows:

	Marks.
Cost of coke	15.20
Ore	26.50
Lime	1.00
Wages and repairs	6.00
Interest and depreciation	2.00
Total	50.70

The cost of the manufacture of pig iron for the Saar district figures out as follows: In the minette district 1000 kg. of Westphalian coke are required per ton of pig iron made when the minette yields 33.3 per cent. of iron. For each per cent. of increased or decreased yield of the ore 50 kg. of coke are added to or deducted from the coke consumption per ton of pig iron. In the case of a yield of 31.3 per cent. the consumption would therefore be 1100 kg. Now, Saar stamped coke is 10 per cent. less effective than Westphalian coke, thus making the consumption 1200 kg. of Saar stamped coke, which costs 17.50 marks f.o.b. Heinitz, so that the fuel cost would be 21 marks. To this must be added an average freight of 1.40 marks per ton of coke to the steel works of the Saar district, or 1.68 marks per ton of pig iron. The price of siliceous ores in Lorraine is 2 marks, while calcareous ores with 31 to 32 per cent. of iron fetch 3 to 3.20 marks per ton, a fair average being 2.50 marks. The freight is 2.41 marks, making a total of about 4.90 marks. With a yield of 31.3 per cent. the quantity needed is 3200 kg. per ton of pig, making the furnace charge, exclusive of manganese, 15.68 marks. To this must be added 2 marks for manganese and the following cost is reached:

	Marks.
Coke	21.00
Freight on coke	1.68
Iron ore	15.68
Manganese	2.00
Wages and repairs	6.00
Interest and depreciation	2.00
Total	48.36

In the Moselle district, or in Lorraine, there must be added to the cost of 15 marks for Westphalian syndicate coke 8 marks for freight, or for 1100 kg. coke consumption 25.30 marks at furnace per ton of pig iron. Ores cost an average of 2.50 marks, to which must be added 0.40 mark for freight. The result is as follows:

	Marks.
Coke plus freight	25.30
Ore at furnace	9.28
Manganese	2.00
Wages and repairs	6.00
Interest and depreciation	2.00
Total	44.58

Freights to tidewater for the Saar district are 8 marks to Antwerp and 12 marks to Rotterdam, while the works on the lower Rhine reach both ports by water at a cost of 1 to 1.50 marks, and the plants at Dortmund get to Emden at 2 marks.

The Crop Promise of Prosperity.

The revival of business late last summer began with strong indications of bountiful crops. It became pronounced when the harvests were gathered. The final figures on all crops, except cotton, given out by the Department of Agriculture assure another year of prosperity.

The corn crop of last year was a little more than twice as large as that of 1894, an expectionally light crop. The farm value per bushel is not very different, but the aggregate value of the crop is nearly double that of the crop 10 years ago, is greater than that of any previous corn crop, and is one of the two crops worth more than $1,000,000,000. The wheat crop is 92,000,000 bushels greater than that of 1894, the farm value per bushel is given at over 92 cents instead of a little less than 50 cents, and the aggregate value is a good deal more than double that of the crop of 1894. It is with one exception the most valuable wheat crop ever gathered here, and is one of two crops worth more than $500,000,000. The other crops are also good, although some of them are not quite so good as last year, and the value of all the crops, cotton excepted, is nearly $190,000,000 above that of 1903.

The fall in the price of cotton is a severe blow to the South, but the quantity of the crop assures a great business for Southern railroads, and the cotton farmer, like the wheat farmer, must take his lean years with the fat. Even at low prices the crop is so large that it will carry a vast sum of money to the South. It is complained that the present price will not cover the cost of production, but the last five crops have been computed to be worth to the South $800,000,000 or $1,000,000,000 more than the five preceding crops, and, as to the current crop, it is to be borne in mind that the yield per acre is about 30 pounds more than in the previous year and slightly more than in any preceding year since 1898, when an unprecedented yield afforded the largest crop ever produced before the current one.

There were various causes for the depression that lasted four years after the panic of 1893. These would have precipitated the panic, but the recovery would have been much more prompt if agricultural conditions had been more satisfactory. The wheat crop of 1893 and the corn crop of 1894 were exceptionally small. The farm values of wheat in December, 1893, 1894 and 1895 were a little over and a little under 50 cents. In cotton, too, there was some light production coincident with low prices. Both Northern and Southern agriculture suffered. The wheat crops of the last four years have amounted to 50 per cent. more than in the four years of depression, and the values have ranged from 20 per cent. to 80 per cent. higher. The corn crops have been larger than in the earlier four years, and their aggregate values have been 75 or 80 per cent, greater. The last five years have been notably prosperous years for the cotton farmers. These crops have made great business for the railroads, and they have given the producers a purchasing power that has extended prosperity to all business.

Recovery from the depression following 1873 came with large wheat crops in 1879 and 1880 and a great European demand. Much the heaviest wheat crop we had produced up to that time occurred in 1891, coincidently with general crop failures through Europe, and the result was the unusually prosperous year of 1892. On account of the financial disturbances of 1890, both abroad and here, the panic of 1893 would probably have occurred two years earlier but for this conjunction of a great wheat crop here and poor ones abroad. The revival of business after the last depression began with the wheat crop of 1897, the largest we had had except that of 1891, when again, fortunately for us, European crops were poor.

Ready Made Homes for New Industries.

Every industrial community, possibly excepting some of the newer manufacturing centers, has old vacant mill and factory buildings, but there are comparatively few cities or towns that can offer ready made attractive homes for new industries. Uusually the best that can be done when a new industry seeks to be placed is an old shop or factory, or else a plant that has been vacated by a business that has proved a financial failure. The former is usually unattractive and inconvenient, while the latter is apt to be too large for the purposes of the type of manufacturer who is seeking a location for a business, especially if it be a new business, which is usually the case. Such a manufacturer wants a limited space, but he expects the conveniences and economies of modern equipment and arrangement. He does not wish to buy or build a plant. In the beginning it may be impossible to tell what the future will require in the way of an establishment. Quarters are needed during what may be called the probationary period of the industry, which usually covers several years. Frequently the nature of the business is such that unless other products are added large space will never be necessary. The city or town that has a large industrial building so designed as to meet the needs of a number of small industries, or that can be arranged to suit its tenants, whatever their need may be, is pretty sure to get its full share of budding industries. And it is from these classes of industries that the great plants of the future may develop. The industrial building should have its power station to operate the machinery of its tenants, if they wish it, at a reasonable cost. Usually the landlord from his economical central station, making power in a large unit, can sell it to small consumers at a price lower than they can make it themselves in the small units that would serve their purposes if they had to depend upon power plants of their own. Various projects to establish such buildings are under way in New England, which will put the places in which they are located at a great advantage over those communities that have no such inducement to offer to manufacturers.

The Ignoring of Specifications by Machine Tool Buyers.

Not infrequently one hears complaint that machine tools are submitted in competition regardless of specifications, and consequently at such low prices that they win out over tools submitted by manufacturers who bid on the basis of the strict letter of the specifications. Such instances usually occur, according to the complaints, where great corporations, especially railroads, widely separate their engineering and purchasing departments, so that the men who make up the specifications have little or no voice in the awarding of contracts. The engineering department knows what it wants in the shops and embodies the knowledge in the terms of the competition. But when the bids are received, the purchasing department looks mostly at the price, and the lowest bidder gets the order.

We are inclined to think that this complaint is not so well founded as it used to be. Tools submitted in competition must have the essential features of the specifications. It is in what they will accomplish that the difference lies. And here comes in the old question of guarantees. Specifications call for a certain minimum amount of work from the tool. This must be guaranteed, and the era of the high speed steels has placed a new aspect on the whole matter of production and consequently of guarantees. It is a well-known fact that it depends a good deal nowadays how skillful the operator is in getting results from the modern machine tool, a lathe, for instance, when used with the new steels. The expert of the tool builder gets much more work out of a lathe than the machinist who earns $2 or $2.50 a day. It is the difference between the high class specialist and the everyday mechanic. The guarantee is that a lathe shall do so much work an hour, or, in other words, shall remove so much stock an hour. The lathe with the expert to operate it can accomplish this, but perhaps it cannot with the untrained man. Consequently the question of guarantee becomes a mooted one.

This difference has been the basis of more than one complaint that a machine has not come up to its guarantee. It is also the excuse given in answer to complaint that a cheap tool has won out in competition in which more powerful and better made machines were competitors at a higher figure. But, just as often, complaints of unsuccessful bidders have been based on reports that

have come to them from shops in which the winning tools are at work that they will not do the work they were guaranteed to do, when the reason they do not do it is that the lathe hand does not know how to operate the machine.

Doubtless there is an occasional instance of a machine tool builder taking advantage of his competitors and of the customer by underbidding with an inferior machine. Doubtless also there are still large corporations that set aside their engineering departments when it comes to awarding contracts. But this is less the case than it used to be. Many purchasing agents nowadays are no mean engineers themselves. They know the value of high-class machinery, and that it is cheaper at a fair price than inferior equipment at a low price. And the injustice complained of must from force of circumstances grow less and less as time goes by. In most great shops very high class men look after shop equipment. It would not be so easy to fool them as it used to be with their predecessors. Modern conditions of manufacture require high standards of mechanical equipment. A careful analysis of recent large awards for machine tools would probably reveal the fact that specifications were pretty well lived up to in the tools that won.

Aid for the Merchant Marine.

Commission's Measure Presented in Senate and House.

WASHINGTON, D. C., January 10, 1905.—The problem of supplying at least a measure of relief to the waning shipbuilding and shipowning industries of the country has been drawn sharply to the attention of Congress during the past week by the filing of the report of the Merchant Marine Commission, the simultaneous introduction in both houses of a bill drafted by the Commission, and the publication of the annual report of the Commissioner of Navigation. The Commission's bill was introduced in the Senate by Senator Gallinger, chairman of the Commission, and referred to the Committee on Commerce, and in the House by Representative Grosvenor, and referred to the Committee on the Merchant Marine and Fisheries. The measure will receive prompt attention in both committees and an earnest effort will be made to secure favorable reports at an early date and to have the bills considered simultaneously in both houses with a view to the enactment of this important legislation before adjournment on March 4.

A Conservative Measure.

The proposition embodied in the Gallinger-Grosvenor bill is regarded in Congress as the most conservative measure embodying any form of direct subsidy that has been presented in recent years. At the same time it is believed that if adopted it will stimulate the building and operation in the foreign trade of cargo carrying vessels, both steam and sail, and incidentally will develop an important arm of the national defense—namely, the naval militia. Briefly stated, the chief provision of the bill grants for ten years a subsidy of $5 per gross registered ton per annum to American vessels that may enter the foreign trade under contracts with the Government, containing certain stipulations as to naval reserve crews, naval service in time of war, free carriage of the mails, &c. The bill further provides for an increase in the present graduated tonnage taxes, which range from 3 to 6 cents per ton for the first five entries per annum, to 8 to 16 cents for the first ten entries, with a rebate of 80 per cent. to American vessels carrying naval reserve boys or apprentices. Provision is also made for the payment of annual bonuses to sailors enlisted in the naval reserve, ranging from $25 for seamen up to $100 for a master or chief engineer of a vessel of 5000 gross tons. Another feature of the bill provides subventions for ten mail routes, nearly all of which are new, the rates being such as, it is believed, will induce ship owners to establish several new and important lines of steamers of 12 to 14 knots' speed.

Cost of Proposed Legislation.

The approximate cost of this legislation for the fiscal year ending June 30, 1906, is estimated by the Commission at $3,060,605, which ultimately may be increased by about $2,000,000 when all the proposed new mail routes are established. Of the sum estimated as likely to be spent during the fiscal year 1906, $2,244,355 would be distributed among steam and sailing vessels, while the annual retainers to naval volunteers (estimated at 3000) would be $150,000, and the mail subventions, calculated at one-fourth of the maximum, would be $666,250. According to the Commission's figures the subvention of $5 per ton is about equal to the amount proposed in the Frye bill as pending in the Fifty-seventh Congress. Estimating the mileage of a cargo steamship of 3500 or 4000 tons at about 40,000 miles per annum, the subvention would be equal to 1¼ per cent. per 100 miles per ton. In the case of a sailing vessel, which is usually credited with about 20,000 miles per annum, the rate would be 2½ cents per 100 miles per ton, from which it will be seen that the Commission's proposition is distinctly to the advantage of large sailing vessels. This subvention, in the opinion of the Commission, effectually bridges the difference of cost of construction and of maintenance, based on wages here and abroad, so far as concerns the average freighting vessel, steam or sail, and thereby would give our merchant ships a fighting chance again upon the ocean. As a partial offset to the expenditures involved in the Commission's plan, the increased tonnage taxes, paid almost entirely by foreign vessels, are estimated to net at least $2,000,000 more than at present.

Injustice to Shipbuilding Industry.

In presenting the Gallinger-Grosvenor bill the Merchant Marine Commission devotes considerable space in its report to the matter of the present cost of materials for steel vessels in the United States and the conditions in the iron and steel industry, which it is claimed operate to the disadvantage of the American shipbuilder. The testimony of James C. Wallace, president of the American Shipbuilding Company, recently given before the Commission while at Cleveland, is cited, in which it is stated that the United States Steel Corporation sold ship plates, delivered at Belfast, Ireland, at $24 a ton, while American shipbuilders were obliged to pay $32 a ton for the same plates at Pittsburgh. Commenting upon this evidence, the Commission says:

> Whatever may be said for the occasional sale abroad of surplus manufactures below the domestic price, this manifestly is a case for which the familiar defense is quite impossible. American shipbuilding is terribly depressed; it is essentially an unprotected industry in the foreign trade, and when American steel mills, long and amply protected, sell material to foreign ship yards at $8 or $10 below the price asked from American yards, these steel mills simply heap an unjust and intolerable burden upon an interest now well nigh prostrate.
>
> A sense of fair play, or even cool business prudence, should make it manifest to the steel companies that they ought to do their utmost to encourage the struggling American ship yards. For, after all, the best and permanent market for American ship steel must be in this country, and not in Europe.
>
> In view of these circumstances the Commission recommends that the law be so changed that the period during which ships built of free materials are allowed to run in the coast trade be extended from two to six months, and also that the privilege of all the year round service now granted in the Atlantic-Pacific trade be extended to the trade with the Philippines, which, on July 1, 1906, comes under the coastwise laws and regulations. This especial treatment of ship material can, we believe, be justified by the peculiar importance of ocean shipping in the promotion of our commerce and the national defense, and also by the fact that this ocean shipping has remained so long an almost forgotten and unprotected industry.

It is pointed out in this connection that it must not be hastily assumed that even the absolutely free importation of materials would of itself immediately reduce the cost of American ships to the foreign figure. After all, the steel materials, while a large factor, are not the dominant one in the cost of ship construction. The controlling factor is the high wages of the skilled American workmen who fashion the plates and beams into the finished ships.

No Premiums for Speedy Vessels.

It will be remarked that there is nothing in the Gallinger-Grosvenor bill to encourage the building and maintenance of expensive "greyhounds" for the mail, passenger and express cargo service to Great Britain and the Continent. The Commission has given particular attention to this important phase of the problem, and states that while expert engineers, shipbuilders and steamship managers have been invited to present their views with regard to the North Atlantic fast mail and passenger service, it "regrets to say that information that would be adequate to guide the action of our Government has not yet been secured." An interesting fact developed in this connection is the attention which the Commission has given to the probable influence of the steam turbine on the future of marine propulsion. With regard to the difficulties presented in the proper treatment of the North Atlantic steamship service, the Commission says:

"The problem, a formidable one at best, is further seriously complicated at the present time by the partial development of the turbine principle in marine propulsion. The two new giant Cunard steamers will be of this type, yet untried on a large scale in transoceanic navigation, though perhaps destined to work almost another revolution in marine architecture. Besides the Cunard ships two Allan Line steamers of large size, but moderate speed, are being completed in Great Britain for the Canadian mail service, and conflicting reports as to the trial performances of the first of these vessels make a positive recommendation seem all the more premature and ill advised.

"Moreover, the enormous new Cunard subvention of $1,100,000 for 20 years, combined with the extraordinary liberality of the British Government in loaning to the company at a nominal rate the $13,000,000 required to build the new ships, introduced another factor that forbids an immediate recommendation to Congress. It is estimated that with the other generous terms of the contract this subvention is worth to the Cunard Line the equivalent of $2,000,000 or $2,500,000 a year, which would have to be more than offset in amount to produce a corresponding American ocean mail service, covering the higher range of American ship wages and cost of construction. Manifestly the American people, whatever their final decision may be, would hesitate to embark on such a scale of expenditure as this while the imperative technical question of whether the turbine is to supplant reciprocating engines as the screw propeller supplanted the side wheel is still undertimed."

Prompt Action Necessary.

In concluding its report the Commission urges early action upon Congress, declaring that if there is to be remedial legislation it must be prompt and energetic. All the ocean shipyards and steamship companies, except a few mail lines operating under the act of 1891, are looking to instant and vigorous remedial legislation by Congress as the only hope of continued existence. "Within a few weeks," says the report in conclusion, "an important shipyard on the Delaware River, after a long and brave fight against adversity, has succumbed and gone in the hands of receivers. This yard has a splendid modern plant, zealous and capable managers, and the prestige of an active career of half a century. The American Government and people may well ask themselves this grave question: Where in a few years can they find solvent shipyards to contract with to build their battle ships and cruisers unless the complete paralysis now threatening this great industry is speedily arrested by national laws?"

Commissioner Chamberlain's Report.

Much force is added to the representations of the Commission regarding the present condition of the shipbuilding industry by the report of the Commissioner of Navigation for the calendar year 1904, which has just been made public. This report shows that during the year 1065 vessels of all kinds, with an aggregate tonnage of 265,104 gross tons, were built and documented, as compared with 1159 vessels, of 381,970 gross tons, in 1903, and 1262 vessels, of 429,327 gross tons, in 1902. Not only was there a heavy decline in the aggregate tonnage and in the average capacity of the vessels built in 1904, but of the total tonnage constructed in that year only 92,598 tons were built during the last six months. On July 1, 1904, the steel merchant vessels under construction aggregated 94,998 tons, as compared with 255,675 tons on the corresponding date of 1903. Since the beginning of the fiscal year, however, nearly all the steel construction on hand on July 1 has been finished, and, as stated by Commissioner Chamberlain, "At the present time labor and capital employed in construction of the larger types of ocean steam tonnage are almost wholly dependent on appropriations by Congress and bid fair to continue so throughout the year." W. L. C.

National Metal Trades Association Notes.

CINCINNATI, OHIO, January 9, 1905.—Commissioner Eagan has gone to Pittsburgh, where he is booked to address a meeting of the Manufacturers' Association.

The Employers' Association of Chicago is requesting its members to notify the secretary regarding any demands that may be made upon them by the Teamsters' Union before taking any action in the matter.

Judge Cavanagh of Chicago on January 2 appointed a receiver for the Rubber Workers' Union, No. 44, the members of that union claiming that the officers were squandering their funds in order to extricate themselves from legal difficulties.

Indications are that the annual meeting of the New York Metal Trades Association, to be held at 3 p.m. January 12, will be a large and enthusiastic affair. The secretary of this association announces in his bulletin the death of one of the members, H. C. Calkin, Jr.

The Philadelphia Metal Manufacturers' Association, which was but recently organized, is showing splendid results, and is increasing very rapidly in membership.

Business in the metal working lines in St. Louis appears to be fairly good, although there seems to be an oversupply of machinists, pattern makers and brass workers.

The labor bureau of the Worcester Metal Trades Association claims that the demand for labor is on the increase in that section of the country. In some of the larger iron mills, where a majority of the help employed is foreign, a decided scarcity exists.

On January 2 the structural iron workers employed by the Geo. A. Fuller Company, Norcross Bros, Mack & Moore, Roebling Construction Company and J. E. McCoy of Boston, went out on a strike to enforce a demand for 50 cents per hour and eight hours per day. Several assaults have been committed upon employees of the Fuller and Roebling companies, but as yet nothing serious has transpired.

The labor bureau of the Cincinnati Metal Trades Association is seeking more commodious quarters. This department of the association has outgrown its present location and an effort will be made to secure rooms that will provide for its needs for several years to come.

Commissioner Eagan and Secretary Wuest are congratulating themselves on the number of applications for membership that were receieved during December. Everything points to a heavy increase during the year.

James Lappan of James Lappan & Co., boiler manufacturers, Pittsburgh, Pa., is a member of the National Association of Boiler Manufacturers, which has endeavored to have the laws governing the manufacture of marine boiler plate restored to the former standard. The committee of which he is a member will meet in Washington next month to confer with the Government authorities in reference to the matter.

The Diamond Drill & Machine Company, Birdsboro, Pa., has opened an office at 52 Broadway, New York. The company reports that its steel and iron foundries are more busy than they have been for a year past. It also states that it is busy on rolling mill and blast furnace work, and has just completed an order for over 100 slab and ingot cars.

Revised Boiler Regulations.

Hearing Before Secretary of Commerce and Labor.

WASHINGTON, D. C., January 10, 1905.—The Secretary of Commerce and Labor on the 16th inst. will give a hearing to all interested persons upon the question of the adoption of a series of revised regulations governing the construction of marine boilers and the inspection of steam vessels. These regulations were recently completed by the Board of Supervising Inspectors of Steamboats and are now before the head of the department for his approval. It is his desire that the representatives of all interests should be heard, and especially that the boiler manufacturers of the country, who have manifested a very lively interest in the matter, should attend the hearing and give frank expression to their views concerning the proposed modifications. Those who cannot attend in person are invited to communicate with the department in writing.

With the recommendations for changes in the law that are secured through this hearing, the Secretary of Commerce and Labor will complete the draft of a bill now before the department providing important amendments to the statute, repealing the specifications with regard to boiler construction and delegating to the Board of Supervising Inspectors the power to provide by regulation all necessary requirements, thereby making it possible to keep abreast of improvements in the manufacture of boiler plate and the making of boilers.

Materials and Construction of Boilers.

Notwithstanding the restrictions imposed upon the board by the rigid provisions of the existing statute, it has been possible to provide in the revised regulations a number of important amendments, especially in Rules I and II, which relate to the manufacture of boiler plate and the construction of boilers, respectively. As the specifications embodied in the law with regard to the manufacture of boiler plates were not sufficiently detailed to prevent a general overhauling of this rule, it has been so completely recast as to make impracticable a comparison with the present regulation. The text of the revision of Rule I is substantially as follows:

1. Every iron or steel plate intended for the construction of boilers to be used on steam vessels shall be stamped by the manufacturer in at least five places and in the following manner:

At the corners, at a distance of about 8 inches from the edges, and at or near the center of the place, with the name of the manufacturer, the place where manufactured, and the number of pounds tensile stress it will bear to the sectional square inch, which must not be less than 45,000 pounds for iron or 50,000 pounds for steel.

2. Any plate stamped with a higher tensile strength than shown by the test hereinafter prescribed may be restamped by the manufacturer to the tensile strength of the sample, provided it is within the limits prescribed by these rules, such restamping to be done previous to the use of the plates in the manufacture of marine boilers.

3. Whenever inspectors shall find a plate of iron or steel with stamps differing as to the tensile strength of the material, they shall rate the tensile strength of the same in accordance with the lowest stamp found thereon.

4. Boilers built since February 28, 1872, of material stamped and tested according to the requirements of section 4430, revised statutes, and having a record thereof in the office of the local inspectors in the district where the boiler was built or intended to be used, may be used for marine purposes, notwithstanding that such boilers may have been used for other purposes: Provided, that in the judgment of the local inspectors they are deemed safe for the purpose.

5. If the plates possess the physical, chemical, and other lawful qualities required by these rules, the inspector making the test shall stamp the plate near the manufacturer's stamp, with the official stamp of the United States Steamboat Inspection Service, and with the initials of his name and a serial number.

Plates may be tested and inspected at the mills for repairs to marine boilers, or be carried in stock, and such plate or plates shall have a separate record of test report in duplicate for each plate so tested, one report to be furnished through the supervising inspector to the local inspectors of the district in which the boiler manufacturer using the plate is located, and the duplicate report shall be furnished to the boilermaker, who shall transmit the same to the purchaser of the material that is represented by said report. The purchaser shall deliver the same to the local inspectors at the first inspection of such boilers.

6. The inspectors shall visit places where marine boilers are being constructed as often as necessary for the purpose of ascertaining and making a record of the stamps upon the material, its thickness and qualities, except when material has been tested at the mils by an assistant inspector, in which case that officer's report of material, together with the boilermaker's affidavit, may be accepted for the data required.

Testing Regulations.

7. After June 30, 1905, every iron or steel plate, except doubling plates, washers, manhole frames, clip plate braces, crown bars, gusset stays and other similar plate braces, for the construction of boilers to be used in steamers, subject to the provisions of title LII, shall be inspected and tested by an inspector duly authorized under the provisions of said title, as follows:

All material must be free from laminations, cracks, scabs or other defects tending to reduce its strength.

All plates which show defects in these or other respects shall be rejected.

From each plate there shall be taken four test pieces, two for the tensile test from diagonal corners and the other two for the bending test from the other diagonal corners, as hereinafter described.

All the pieces shall be prepared so that the skin shall not be removed, the edges only planed or shaped.

In no case shall test pieces be prepared or reduced in size by hammering.

Tensile test pieces shall be at least 16 inches in length, from 1½ to 3½ inches in width at the ends, which ends shall join by an easy fillet, a straight part in the center of at least 9 inches in length and 1 inch in width: Provided, however, that where samples are tested on the testing machines of the Steamboat Inspection Service the test pieces shall not have a greater width on the ends than 2 inches.

Steel Plates.

8. Only steel plates manufactured by what is known as the basic or acid open hearth processes will be allowed to be used in the construction of boilers for marine purposes, and the manufacturer shall furnish a certificate with each order of steel tested, stating the technical process by which said steel was manufactured. This is not intended to apply to plates used in the construction of Bessemer steel tubes.

No plate made by the acid process shall contain more than 0.06 per cent. of phosphorus and 0.04 per cent. of sulphur, and no plate made by the basic process shall contain more than 0.04 per cent. of phosphorus and 0.04 per cent. of sulphur, to be determined by analysis by the manufacturers, verified by them, and a copy furnished the inspector for each order tested; which analysis shall, if deemed expedient by the Supervising Inspector General, be verified by an outside test at the expense of the manufacturer of the plate.

For steel plates the sample must show, when tested, a tensile strength not lower than 50,000 pounds and not more than 75,000 pounds per square inch of section. No plate shall be stamped with a greater tensile strength than 65,000 pounds. Such sample must also show an elongation of at least 25 per cent. in a length of 2 inches for thickness up to ¼ inch, inclusive; in a length of 4 inches for over ¼ to 7-16 inch, inclusive; in a length of 6 inches for all plates over 7-16 inch. The sample must also show a reduction of sectional area, as follows:

At least 50 per cent. for thickness up to ½ inch, inclusive; 45 per cent. for thickness over ½ to ¾ inch, inclusive, and 32.5 per cent. for thickness over ¾ inch.

Quenching and bending test pieces shall be at least 12 inches in length and from 1 to 3½ inches in width. The sides where sheared or planed must not be rounded, but the edges may have the sharpness taken off with a fine file. The test piece shall be heated to a cherry red (as seen in a dark place) and then plunged into water at a temperature of about 82 degrees F. Thus prepared the sample shall be bent to a curve, the inner radius of which is not greater than one and one-half times the thickness of the sample, without cracks or flaws. The ends must be parallel after bending.

Iron Plates.

9. For iron plates the sample must show, when tested, a tensile strength not lower than 45,000 pounds and not more than 60,000 pounds per square inch of section. It must also show an elongation of at least 15 per cent. in a length of 8 inches. The sample must also show a reduction of sectional area, as follows: For samples showing 45,000 pounds tensile strength, 15 per cent., and for each additional 1000 pounds tensile strength up to 55,000 pounds add 1 per cent. For samples over 55,000 to 60,000 pounds tensile strength, 25 per cent. only will be required.

Bending test pieces shall be at least 12 inches in length and from 1 to 3½ inches in width. The sides where sheared or planed must not be rounded but the edges may have the sharpness taken off with a fine file.

Thus prepared, the sample shall be bent cold to an angle of 90 degrees to a curve, the inner radius of which is not greater than one and one-half times the thickness of the sample, without cracks or flaws.

Changes in Rule II.

In Rule II, governing the construction of boilers, a number of changes have been made designed to protect the manufacturer as well as the public. In paragraph 1 a requirement is inserted that the manufacturer of any boiler to be used in marine purposes shall furnish the inspectors of the district where such boiler is to be in-

spected duplicate blue prints or tracings, one of which shall be kept on file in the office of the local inspectors and the other after approval returned to the manufacturer. At present but a single blue print or tracing is required, and the manufacturer therefore has nothing in the nature of an official record by which to prove that the drawings in accordance with which his boiler was built were officially proved.

In paragraph 4 an amendment has been made requiring that the rivet holes in the shells, heads and flanges, &c., and holes for stay bolts and tubes, shall be fairly drilled "in place"—*i. e.*, after the assembling of the parts. Heretofore it has been permissible to drill these holes at any time during the progress of construction and errors have thus been made the correction of which has left weak spots in the boilers.

An effort has been made in connection with paragraph 9, relating to the placing of stays in boilers, to prevent the shearing or bending of rivets employed in securing braces of all forms. For this purpose the following requirements have been added:

Diameter of pins to resist double shear and bending, accurately fitted and secured in crow feet, sling and similar stays, to be at least equal to diameter of brace. Breadth across each side and depth through crown of eye not to be less than 0.5 to 0.75 of diameter of pin. In order to compensate for inaccurate distribution the forks should be proportioned to support two-thirds of the load. Thickness of forks not to be less than 0.66 to 0.75 of diameter of pin.

The combined sectional area of rivets used in securing tee irons and crow feet to shell, said rivets being in tension, shall not be less than the sectional area of brace. To insure a well proportioned rivet point the total length of shank should closely approximate to the grip plus 1.5 times the diameter of the shank. All rivet holes to be drilled, distance from center of rivet hole to edge of tee irons, crow feet and similar fastenings not to be less than 1.5 times the diameter of rivet hole, rivet holes to be slightly countersunk in order to form a fillet at point and head.

The previous regulations relating to fusible plugs have been very carefully revised. The rigid requirement with regard to the shape as well as size of manholes, limiting them to 11 x 15 inches in the clear, has been recast in the revised regulations, paragraph 30 providing that such openings may be either 11 x 15 or 10 x 16. The existing requirements with regard to boilers 40 inches diameter of shell and under are not changed by the revision.

W. L. C.

New Publications.

Strength and Elasticity of Structural Members. By R. J. Woods, Assistant Professor of Engineering, R. I. E. College, Cooper's Hill, England. Publisher, Edward Arnold, London. Agents for the United States Longmans, Green & Co., New York. Pages 310. Cloth.

The book is mainly intended for students of engineering, the chapters being originally written as a series of lectures for the students at the Royal Indian Engineering College, Cooper's Hill. The subject is treated concisely and so simply as to require only a fair knowledge of elementary mathematics. An explanation of graphic statics forms the first chapter, this being followed by a discussion on stress and strain, stress and strain diagrams, compound stresses, bending moments and shearing forces and moments of inertia. The succeeding chapters take up details in structural engineering, such as girders, the calculation of deflection of beams, masonry structures, retaining walls, columns and struts, riveted joints, &c. The concluding chapters deal with bridges and their parts and with torsion. Diagrams and illustrations are freely used, and a large number of examples are added as exercises for the students in the application of the principles explained in each chapter.

Forge Practice. (Elementary.) By John Lord Bacon, instructor in forge work, Lewis Institute, Chicago. Publishers, John Wiley & Sons, New York. Pages 257. Cloth. Price, $1.50.

This book presents in convenient form, somewhat elaborated, a series of notes given to the students at Lewis Institute in connection with the course in forge shop work. It begins with the rudiments, describing the forge, anvil and tools, the different forms of the latter being shown by simple clear perspective sketches. The next chapter discusses welding, showing the scarfing for various kinds of welds, and indicating the proper flux to use. Chapters 3 and 4 take up respectively the calculation of stock for bent shapes and upsetting, drawing out and bending. Chapter 5 contains a number of examples of simple pieces of forging, illustrating the step by step development. Other chapters deal with the calculation of stock and the making of general forgings, steam hammer work and duplicate work. The succeeding chapters are of a more advanced nature, and discuss the metallurgy of iron and steel, tool steel work, tool forging and tempering and miscellaneous work. A number of useful tables are appended and a comprehensive index. The profuse use of perspective sketches and drawings adds immeasurably to the usefulness of the work. All in all, the book will be found a decided help to those who desire a fair working knowledge of forging, and will be of very material assistance to those who are taking up the subject in practice and can accompany their reading with an actual following out of instructions.

The American Economic Association and the Closed Shop.

President John D. Hibbard of the Chicago Metal Trades Association has addressed an open letter to Frank W. Taussig, president of the American Economic Association, Harvard University, Cambridge, Mass., protesting at the manner in which the discussion on "the open or closed shop" was conducted at the recent meeting of that association in Chicago. He says:

"We have heard a great deal about the necessity of 'fairness' in all dealings between employer and employee and in all discussions of the various questions at issue. My protest is that, knowingly or unknowingly, the American Economic Association was not 'fair.' Of the four principal speakers, the two first—members of your association—argued more or less directly in favor of the closed shop. The last speaker's position was well known, and his line of argument, from a union standpoint, to be expected. In the debate which followed your two members who took part also advocated the closed shop, as did the employer, whose selection must be considered most unfortunate, as he has heretofore repeatedly expressed in public these same ideas. In short, six of the seven speakers of the afternoon favored the closed shop.

"The only expression, therefore, of the employer's side of this question was my own paper, which was intended to be fair and impartial, and to deal strictly with the facts as daily presented to the employer; the motive continually before me being the reciprocal rights and obligations of employer and employee; rights which must be understood and recognized in any fair, broad treatment of the subject. There is probably at the present time no question before employer and employee so important as that of the open shop; conceived by many to be one of the life or death of association.

"If there was no member of your association who could honestly advocate the broad principle of the open shop, it would have been a simple matter to have selected employers conversant with economic conditions and thoroughly competent to present their side of the argument. No possible good can, and much harm may, result from a so manifestly one-sided presentation of this all important question. The radical element of unionism, as well as the corresponding element among employers, can find added arguments for opposition to collective bargaining and agreements. As a fair and open discussion the symposium must be deemed an absolute failure. While possibly we cannot remedy the injustice which I feel has been done to the employers' side in the debate referred to, I write with the hope and belief that it will assist the association in its further consideration of this or similar subjects."

The South Chicago plant of the Illinois Steel Company was started up January 9.

Pig Iron Production Increasing.

Stocks Decline Further.

The production of pig iron reached 1,650,000 tons in December, our returns showing a total of 1,614,000 tons of coke and anthracite iron, to which about 36,000 tons of charcoal iron must be added.

The official statistics of the American Iron and Steel Association made the net output of the first half of the year 8,173,438 tons, including 213,350 tons of charcoal pig. Our returns for the second half show a production of 8,173,228 tons of coke and anthracite iron, which the make of charcoal pig will carry to 8,400,000 tons, so that the production during the whole of 1904 of all kinds of pig iron is close to 16,575,000 tons, which is below the record of 1903, with its product of 18,009,252 tons, and of 1902, with its total of 17,821,307 tons, but in excess of 1901, when the output was 15,878,354 tons.

However, in December we were producing at the rate of 19,500,000 tons of pig iron per annum and were consuming even more. We estimate our maximum capacity with present plant, based on a close study of the output attained recently in the different districts with reference to the additional furnaces approaching completion, at 21,250,000 tons per annum, due allowance being made for necessary stoppages for repairs. It is doubtful whether this aggregate could be attained under prevailing conditions as to the supply of raw materials and of transportation.

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Number of stacks.	January 1. Number in blast.	January 1. Capacity per week.	December 1. Number in blast.	December 1. Capacity per week.
New York:					
Buffalo district	10	8	14,453	8	13,916
Other New York	11	3	2,347	3	2,239
New Jersey	8	4	5,650	4	6,384
Spiegel	2	1	198	1	221
Pennsylvania:					
Lehigh Valley	27	16	10,275	14	9,150
Spiegel	1	1	239	1	204
Schuylkill Valley	13	9	10,240	9	9,940
Low. Susquehanna	10	5	6,488	5	7,463
Lebanon Valley	11	3	2,544	2	1,697
Spiegel	1	0	0	1	529
Pittsburgh district	40	36	95,000	32	89,775
Spiegel	3	3	1,962	3	1,657
Shenango Valley	21	17	31,820	14	26,470
West. Penn	24	16	22,553	14	19,386
Spiegel	1	0	0	0	0
Maryland	5	3	6,097	3	6,162
Wheeling district	13	11	21,295	8	14,960
Ohio:					
Mahoning Valley	17	15	33,735	15	34,562
Central and Northern Ohio and Michigan	18	14	27,750	11	25,000
Hocking Valley	2	0	0	0	0
Hanging Rock	12	8	6,172	8	5,915
Illinois	21	12	27,400	14	33,550
Spiegel	1	0	0	0	0
Minnesota	1	1	1,215	1	1,155
Wisconsin	5	5	4,944	4	4,486
Missouri	1	1	950	1	700
Colorado	5	2	3,976	2	3,947
The South:					
Virginia	23	11	8,060	8	5,039
Kentucky	8	3	1,331	3	1,520
Alabama	43	23	25,463	22	26,020
Tennessee	16	11	4,858	9	4,782
Georgia	1	1	864	1	1,017
North Carolina	1	0	0	0	0
Totals	376	243	377,879	221	357,846

For a series of months the active anthracite and coke furnace capacity fluctuated as follows:

	Coke capacity per week.		Coke capacity per week.
January 1, 1905	377,879	June 1	388,178
December 1, 1904	357,846	May 1	373,496
November 1	334,249	April 1	386,215
October 1	319,249	March 1	347,424
September 1	291,573	February 1	335,339
August 1	246,092	January 1, 1903	346,073
July 1	272,301	December 1, 1902	336,617
June 1	336,197	November 1	330,110
May 1	368,244	October 1	337,837
April 1	337,257	September 1	328,243
March 1	308,751	August 1	328,745
February 1	273,692	July 1	303,793
January 1, 1904	185,636	June 1	337,492
December 1, 1903	244,156	May 1	337,627
November 1	273,715	April 1	331,140
October 1	353,142	March 1	316,039
September 1	360,197	February 1	325,440
August 1	353,681	January 1, 1902	291,992
July 1	384,825	December 1, 1901	317,358

There were started during December one Bethlehem furnace and one Saucon furnace of the Thomas Iron Company, in the Lehigh Valley; Edith, Neville Island, one Edgar Thomson and Clairton, in the Pittsburgh district; Ella, one New Castle and one Shenango, in the Shenango Valley; one Johnstown and one Rockhill, in western Pennsylvania; three Mingo in the Wheeling district; one Columbus, Franklin and Steelton, in central Ohio; Spring Valley, in Wisconsin; Victoria Bristol and Radford Crane, in Virginia; one Sheffield, in Alabama, and one Rockwood and one South Pittsburg, in Tennessee.

There were blown out one Joliet and one South Chicago furnace in Illinois.

Monthly Pig Iron Production.

	August. (31 days)	September. (30 days)	October. (31 days)	November. (30 days)	December. (31 days)
New York	43,200	44,725	63,701	67,735	72,752
New Jersey	22,116	19,192	29,744	28,308	21,464
Lehigh Valley	34,867	33,166	37,270	39,069	44,581
Schuylkill Val.	28,667	27,055	29,081	39,165	45,335
Lower Susquehanna and Lebanon Val.	38,435	38,960	43,319	41,526	39,999
Pittsburgh dis.	340,053	395,324	402,880	382,316	412,433
Shenango Val.	64,374	92,273	100,557	106,326	131,417
West. Penn.	70,006	68,974	78,451	82,787	92,478
Md., Va. and Kentucky	46,583	48,200	44,547	51,499	66,339
Wheeling dis.	42,784	80,279	64,401	64,517	86,306
Mahoning Val.	85,126	104,724	109,918	129,774	149,397
Cent. and No.	52,954	72,906	91,182	98,610	103,522
Hocking Valley and Hanging Rock	16,948	21,449	22,406	24,295	27,336
Ill., Mich., Minn., Wis., Mo. and Col.	172,488	184,788	199,125	192,488	184,873
Alabama	82,536	95,045	111,638	111,016	112,778
Tennessee, No. Carolina and Georgia	26,535	25,617	22,181	22,401	23,339
Totals	1,167,672	1,352,677	1,450,401	1,481,832	1,614,349

We estimate the production of the anthracite and coke furnaces monthly as follows:

Production of Coke and Anthracite Pig.

	1903. Gross tons.	1904. Gross tons.
January (31 days)	1,472,788	921,231
February (29 days)	1,390,615	1,205,449
March (31 days)	1,590,470	1,447,065
April (30 days)	1,608,431	1,557,267
May (31 days)	1,713,614	1,533,350
June (30 days)	1,673,228	1,292,030
July (31 days)	1,546,184	1,106,297
August (31 days)	1,571,126	1,167,672
September (30 days)	1,553,717	1,352,677
October (31 days)	1,425,658	1,450,401
November (30 days)	1,039,622	1,481,832
December (31 days)	846,605	1,614,349

These figures do not include the production of the charcoal furnaces, which have during the first six months of 1904 averaged about 35,500 tons per month.

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Ashland, Republic, Jones & Laughlin, La Belle, Bethehem, Calumet and Colorado companies show the following totals of product month by month. We present also separately monthly figures of the production of spiegeleisen and ferromanganese, which is included in the total:

Production of Steel Companies.

	Pig.—Total production. 1903.	1904.	Spiegeleisen and ferromanganese. 1903.	1904.
January	.....	502,994	.....	6,673
February	.....	756,260	.....	12,961
March	.....	913,412	.....	23,128
April	966,850	974,006	11,755	29,145
May	1,037,325	927,534	17,600	25,755
June	1,021,839	788,822	16,309	24,950

July	987,855	694,892	14,933	27,284
August	993,564	747,570	15,862	19,280
September	956,363	936,494	8,406	20,723
October	829,215	971,447	10,374	13,669
November	553,067	962,384	17,695	13,442
December	406,730	1,019,841	15,394	13,325

Deducting from the total monthly production the output of the steel companies we reach the following series of figures, which represent closely the make of the merchant furnaces. Taking into account the fluctuations in the stocks, we arrive at the apparent consumption from month to month:

Statistics of the Merchant Furnaces.

1904.	Production. Gross tons.	Increase (+) or decrease (—) of stock. Gross tons.	Apparent consumption. Gross tons.
January	418,237	— 21,502	439,739
February	449,219	— 46,857	495,076
March	533,653	— 71,632	605,285
April	583,261	— 13,854	597,115
May	605,816	+ 101,833	503,983
June	503,208	+ 74,952	428,256
July	511,405	+ 49,496	461,909
August	420,102	— 39,541	459,643
September	416,183	— 75,354	491,537
October	478,954	— 26,414	505,368
November	519,448	— 70,239	589,687
December	594,508	— 121,168	715,676

The rapid fluctuations in the apparent consumption are very notable, and the increase in the last quarter is particular striking.

Stocks.

Believing that a classification of the merchant stocks by general geographical divisions would aid in a correct appreciation of the situation, we have arranged them in three groups: The Eastern, which includes New York, New Jersey and the Schuylkill, Lehigh, Lower Susquehanna and Lebanon valleys; the Central Western and Northwestern, which includes western Pennsylvania, the Shenango and Mahoning valleys, the Hanging Rock region, central and northern Ohio, and Michigan, Illinois, Wisconsin, Minnesota and Missouri, and the Southern, which includes Virginia, Kentucky, North Carolina, Georgia, Alabama and Tennessee. The stocks, of course, do not include the holdings of the steel companies:

Merchant Furnace Stocks.

	Sept. 1.	Oct. 1.	Nov. 1.	Dec. 1.	Jan. 1.
East	104,270	96,397	88,980	88,142	84,967
Central and Northwest	295,510	269,047	247,769	210,080	111,130
South	231,021	190,003	192,284	160,572	141,529
Totals	630,801	555,447	529,033	458,794	337,626

The reduction in the stocks has been particularly marked in the Central West and in the Northwest.

NEWS OF THE WORKS.

Iron and Steel.

Parties interested in the affairs of the Diamond State Steel Company, Wilmington, Del., held a meeting January 5 to consider plans for the best interests of creditors, stockholders and bondholders of the company, which resulted in the appointment of a reorganization committee, consisting of H. H. Haines, George W. Todd, Robert Whitaker, David H. Ross and Jacob H. Lewis. The committee adopted an agreement prepared by Samuel Dickson of Philadelphia and Anthony Higgins of Wilmington, which will be submitted to the creditors for their co-operation and signatures.

The Kenton Iron & Steel Company of Kentucky, Mason City, W. Va., has let a contract for the erection of a frame building 80 x 400 feet, with corrugated iron roofing and siding. The company will make merchant iron and steel bars, and expects to commence operations about June 1 with four busheling furnaces and one 10-inch finishing mill.

Gen. E. Burd Grubb, a stockholder of the Pennsylvania Furnace Company, instituted equity proceedings in Common Pleas Court last week to enjoin the selling committee of the corporation from making permanent sale of the company's property at Sheridan and Cornwall, Pa., to Robert E. J. Corcoran of Brooklyn, N. Y. It was also sought to have Corcoran declared trustee for the company and its stockholders. General Grubb maintains that the committee in selling the business to Corcoran for $180,000 only intends to turn in $140,000 to the treasury of the company, applying the difference to its own use. He seeks to enjoin this action to protect his rights as a stockholder.

The Ohio Rolling Mill Company property in Findlay, Ohio, has been sold by A. M. Snyder of Cleveland to C. C. Bigelow and D. T. Davis of Findlay. The rolling mill building and sheds occupy nearly 12 acres of ground.

The Thomas Iron Company has just put its No. 6 furnace, at Hokendauqua, Pa., into blast. The company is now running eight furnaces in the Lehigh Valley district and has one other furnace available for blast. It is also at Hokendauqua, but the company has no idea of starting it until lake navigation opens in the spring.

The resumption of work by a number of furnaces at points in the Lehigh and Schuylkill valleys has caused ore mines in Northampton, Carbon and Lehigh counties, Pa., to start. Among the mines which have reopened are those at Rittenhouse Gap and Dunkel.

The Empire Steel & Iron Company is putting its Macungie Furnace, at Macungie, Pa., into shape for operation if needed. No time has been fixed for starting.

One of the furnaces at Rockhill, Huntingdon County, Pa., has been started by the owner, the Rockhill Iron & Coal Company, Philadelphia. The stack was put in blast in December after a long idleness.

The American Rolling Mill Corporation, Chicago, Ill., has rebuilt the furnaces and increased the tonnage output of its plant at Muncie, Ind., where it will begin rolling iron and steel bars about January 15. The company will make a special feature of rolling high grade double refined iron and steel bars, ranging in sizes as follows: Rounds and squares, ¼ to 2 inches diameter; flats, ½ x ¼ up to 4 x ½ inch.

The Susquehanna Iron & Steel Company, Columbia, Pa., expects to blow in Vesta Furnace in April.

Shenango Furnace No. 2, at Sharpsville, Pa., was blown in December 28.

Ella Furnace, at West Middlesex, Pa., was blown in December 23.

The Spring Valley Iron & Ore Company, F. H. Foote, proprietor, Chicago, Ill., has been sold to the Spring Valley Iron & Ore Company, Incorporated. The officers are Frederick H. Foote, president and treasurer; George C. Foote, vice-president and Wallace P. Foote, secretary. The furnace is located at Spring Valley, Wis.

Secaucus Furnace of the Hudson Iron Company, at Secaucus, N. J., will be blown in shortly.

Furnace C of the Buffalo & Susquehanna Iron Company, Buffalo, N. Y., was blown in December 8.

We are advised that the statement that the Sharon Steel Hoop Company, Sharon, Pa., had placed a contract for a 10-inch mill and heating furnaces with the Morgan Engineering Company, Alliance, Ohio, is untrue. This contract has been placed with the Morgan Construction Company, Worcester, Mass. The Sharon Steel Hoop Company has not bought any machinery from the Morgan Engineering Company.

One of the two blast furnaces of the Carnegie Steel Company at Donora, Pa., was started last week. This furnace is expected to turn out about 600 tons of Bessemer iron per day, and the other stack will be started within a week or ten days.

The American Sheet & Tin Plate Company has decided to use gas instead of coal for fuel in the Humbert Works at South Connellsville, Pa., and in the two sheet plants at Scottdale, Pa. The necessary changes in the fuel equipment are now being made to accommodate the use of gas.

The American Sheet & Tin Plate Company, Frick Building, Pittsburgh, has decided to increase the number of finishing stands in the continuous sheet mill at Sharon, Pa., from eight to ten. Two additional furnaces in the finishing department are also to be installed. The continuous mill will finish sheets of No. 22 gauge and heavier without hand rolling on finishing mills, while the lighter gauges will require hand rolling. The mills will be placed in operation in April. A large galvanizing and corrugated roofing plant is to be added to the Ætna-Standard department of the company, at Martins Ferry, Ohio. The building will be 70 x 520 feet and will have a weekly output of 300 tons of roofing material and galvanized sheets.

Work on the erection of the new tube mill of the Youngstown Iron Sheet & Tube Company, at Youngstown, Ohio, is progressing rapidly. The foundations are all completed and the erection of the structural work has been commenced. Some of the machinery for the mill is already on the ground, and the plant is expected to be completed about April 1. This mill will roll pipe up to 12 inches in diameter.

The Berkshire Iron Works is the name of a new company formed at Reading, Pa., to manufacture iron and steel pipes, structural iron and plates. The capital is $5000, which will be increased now that a charter has been granted, and the directors are: Robert E. J. Corcoran, Brooklyn; Edson Bisbee, Ralph Bisbee and George N. Hamlin, New York; H. Y. Yost and P. L. Sieber, Reading. Mr. Corcoran is identified with the Sheridan furnaces, having purchased them from the Pennsylvania Furnace Company a short time ago.

A. F. Baumgarten and his brother of Pittsburgh, Pa., are at the head of the syndicate which recently purchased the plant of the Louisville Bolt & Iron Company, Louisville, Ky.

General Machinery.

It is probable that William T. Wood & Co., Arlington, Mass., will require very little, if any, new machinery, as so far as ascertained the equipment was not seriously damaged by the recent fire at their plant. The forge shop was practically destroyed and will be rebuilt as soon as the weather will permit, but the power plant and machine shop were not damaged. The company has installed a temporary forge shop, so that there will be no interruption in its business.

The Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., has just filled its record order for 20 heavy grinders, for 4 x 36 inch wheel, nine of them motor driven, the remainder belt driven.

The Philadelphia Pneumatic Tool Company, Philadelphia, Pa., has reincorporated under the laws of the State of New Jersey, with a capital stock of $1,000,000.

The C. O. Bartlett & Snow Company, Cleveland, Ohio, reports the following recent sales: Dundee Silica Sand Company, Dundee, Ohio, elevating and conveying machinery; Leisy Brewing Company, Cleveland, Ohio, tube barley conveyor; Pattison Supply Company, Cleveland, Ohio, coal conveyor; T. S. Henderson & Co., St. Louis, Mo., special cable conveyor; C. L. Holck & Co., Monterey, Mexico, mining machinery; Royal Crown Lead Company, Detroit, Mich., paint machinery; Moore Bros., Cleveland, Ohio, paint machinery; Lowe Bros., Dayton, Ohio, paint machinery; Memphis White Lead Company, Memphis, Tenn., paint machinery; International Harvester Company, Chicago, Ill., paint machinery; Independent Stone Company, Cleveland, Ohio, two steam hoists and derricks; the Underwriters Land Company, Carthage, Mo., large ore elevator; Lorain Supply Company, Lorain, Ohio, style E rotary dryer; the Berg Company, Philadelphia, Pa., Triumph steam dryer; General Chemical Company, Cleveland, Ohio, direct heat dryer; Brightman Chemical Company, New Brighton, Pa., salt rotary dryer; Ross Keller Triple Pressure Machine Company, St. Louis, Mo., direct heat rotary dryer.

Power Plant Equipment.

The J. Thompson & Son Mfg. Company, Beloit, Wis., maker of the Thompson-Lewis gas engine, is rebuilding the part of its plant which was recently destroyed by fire, and expects to have it in operation by February 1. The company is not in the market at the present time for any new machinery. The blacksmith department, power plant, punch and shear room, warehouse and stock were saved.

The Marine Boiler Works Company, Toledo, Ohio, has increased its capital from $100,000 to $125,000 and has changed from a New York to an Ohio corporation. The new capital will be used to enlarge the plant and some new machinery will be installed.

The H. A. Tuttle Mfg. Company, South Norwalk, Conn., has begun the manufacture of a line of gasoline motors of the four-cycle type, of 5, 10, 15 and 30 horse-power.

The Westinghouse Electric & Mfg. Company has closed a contract with the Ontario Power Company for an alternating current generator with a rated output of 10,000 horse-power at 85 per cent. power factor. This is in addition to three other machines of similar type which the Westinghouse Company is furnishing for this plant. Among other apparatus included in the contracts are 12 3000-kw. oil insulated water cooled transformers, wound for 12,000 and 60,000 volts; two 375-kw. exciters, and complete switchboards. P. N. Nunn and L. L. Nunn are engineers in charge, and the plant is being built by the Niagara Construction Company, of which Gen. Francis V. Greene is president. The company has also sold to the Syracuse Railroad Construction Company apparatus for the complete equipment of the Rochester, Syracuse & Eastern Railroad. The contracts include two 1500-kw. turbo-generator outfits, two 500-kw. rotary converters and six 400-kw. rotary converters, 24 transformers, &c. The company also received an order through its agents, Takata & Co., of Tokio, for 13 direct current generators, each of 62.5 kw. capacity, and 13 spare armatures. Each generator will be driven by a 125 horse-power steam engine, and the 13 engines will be supplied by the Westinghouse Machine Company.

Foundries.

The receivers of the Delaware River Steel Casting Company, Chester, Pa., have filed a petition in court for the sale of the property. There is a mortgage of $300,000 to secure $146,000 worth of bonds and mechanics' liens amounting to $17,000.

The Mt. Vernon Car Mfg. Company, Mt. Vernon, Ill., is enlarging its wheel foundry with an addition, 30 x 210 feet, and will also put in more wheel pits.

The William J. Oliver Mfg. Company, Knoxville, Tenn., has purchased adjoining property, upon which it will erect a large foundry, doubling the present capacity. The company operates a large and modern foundry and machine shop and in addition to the manufacture of car wheels, contractors' cars, coal mining machinery and the repairing of locomotives, etc., will do a general foundry business. Most of the equipment needed for the new foundry will be moved from the present foundry.

The State of Pennsylvania has granted a charter to the Hiende Foundry Company, Hanover, York County, Pa., which is composed of J. Hoffman, George W. Gore and H. Heindel. The company will do a general foundry business.

Fires.

Cotton mill No. 1 of the Edwards Mfg. Company, Augusta, Maine was recently destroyed by fire. The loss is placed at $75,000.

On January 5 a fire did $40,000 damage to the cooperage plant of the J. C. Rouse Company, Brooklyn, N. Y.

The brick manufacturing plant of Hatch Bros. at Fish House Station, six miles above Camden, N. J., was damaged $25,000 by fire on January 7. The main building, 60 x 150 feet, was destroyed.

Hardware.

The Portland Cordage Company is just completing a large plant at Seattle, Wash. The factory is served by switch tracks from both the Northern Pacific and the Great Northern roads and also is within two blocks of the Great Northern steamship docks. The plant consists of a series of buildings, all of concrete, with cement floors, the ground areas of the buildings aggregating 100,000 square feet. The rope walk is 1600 feet long, 40 feet wide, 4 tracks. The machinery already installed consists of an equipment of preparation machinery furnished by the Watson Machine Company: 72 high speed Haskell-Dawes jennies, and a number of small rope machines of the same make; also a number of stationary layers, from 3-16 up to ⅝ inch diameter, with the necessary forming machines and several modern lariat rope machines. A tarring plant is also provided equipped for 60 bobbins. The rope walk machinery was built in the company's shops after its own design. All machinery is electrically driven. The buildings are steam heated and electric lighted. The plant will be equipped to make rope up to 6 inches diameter and 200 fathoms long.

Miscellaneous.

The Burt Mfg. Company, Akron, Ohio, is having a good demand for its oil filters, both at home and abroad. Recent shipments include 21 oil filters to its agency at Havana, Cuba; 9 oil filters and 6 exhaust heads to its agency at Sydney, Australia; 18 oil filters to its agency at St. Petersburg, Russia; 3 oil filters to its agency at Calcutta, India; 4 oil filters to Spain, and 2 20-inch exhaust heads to its agency at London, England; 1 10-inch exhaust, American Steel Wire Company; 1 24-inch exhaust head, National Steel Company, and 1 120-gallon oil filter, National Tube Company, McKeesport, Pa.; large oil filters to Munising Paper Company, Munising, Mich.; Singer Sewing Machine Company, Elizabethport, N. J.; Atlantic Mills, Providence, R. I., and United States Coal & Coke Company, for its mines in West Virginia. A 20-inch exhaust head has been shipped to the Crane Company, Chicago, and another of the same size to the large power house in San José, Cal.

The Pratt Elevator Safety Company, New York, has incorporated with a capital stock of $50,000, to make the Pratt elevator safety clutch. For the present the clutches will be made by contract. C. R. Pratt is manager, with offices at 160 Fifth avenue.

The Johnston Mfg. Company, Urbana, Ohio, maker of tin and galvanized iron railroad ware and also rural free delivery mail boxes, has recently enlisted new capital and has made some improvements to its plant.

The Philadelphia Quartz Company, Philadelphia, Pa., has about decided upon what new machinery it will require for its new plant at Chester. It is probable that a considerable portion of the present equipment will be installed in the new buildings.

Alvin M. McClure has been appointed receiver for the Central Car & Foundry Company, which was recently organized and which had started work upon the erection of a large car building plant at Vincennes, Ind.

The Buckeye Construction Company has been incorporated at Buffalo, N. Y., with a capital stock of $50,000, to build railways, tramways, roadways and structural work. Directors: Robt. H. Hefford, H. H. Littel, J. B. Meyer, J. J. McWilliams and H. C. Denny, Buffalo.

The blast furnace at Tuscaloosa, Ala., of the Central Iron & Coal Company, one of the Central Foundry Company's subsidiary companies, which has been temporarily out of blast for the past two weeks owing to the necessity for relining part of the stack, will again be in full operation on January 18, and should, with the accumulation of raw materials created by virtue of the close down, be placed on an output of not less than 250 tons of foundry pig iron per day. The work on the Semet-Solvay by-product coke ovens which the company is erecting at Tuscaloosa is progressing very rapidly and they will be completed within the next four months, giving the Central Iron & Coal Company a daily coke capacity of about 800 tons.

OBITUARY.

SAMUEL FORTER.

In the death of Samuel Forter, which occurred at his home in Bellevue, near Pittsburgh, on Sunday morning, January 8, the engineering profession has lost one of its most valuable and honorable members. Mr. Forter was born in St. Gall, Switzerland, in 1851, and at an early age showed an inclination for his profession. After graduating from a leading polytechnic school of Europe he came to this country in 1881, and followed his profession continuously until his health would not permit. Until the last he was mentally exceedingly active, although physically disabled through disease. Mr. Forter was the inventor of the well-known Forter water sealed gas producer, Forter water sealed reversing valve and Forter furnace charger: in fact, the patent records show many important devices patented by him, and which are now in use by the leading steel companies of this country. For four years previous to his death Mr. Forter was chief engineer and vice-president of the Forter-Miller Engineering Company, Pittsburgh, Pa., and through his untiring efforts that company attained its rank among the leading engineering and contracting concerns of the country.

SAMUEL FORTER.

NOTES.

HENRY B. VAN VLECK, New York City representative of the metal firm of W. W. Montague & Co., San Francisco, Cal., died January 2, at his apartment in the Hotel St. George, Brooklyn, aged 65 years. Mr. Van Vleck had been connected with the firm for 37 years. He was born in Hudson, N. Y., and leaves a widow, one son and a daughter.

EDWARD A. WALCOTT, head of the firm of Geo. D. Walcott & Son, manufacturers of machinists' tools, Detroit, Mich., died December 28, after a brief illness.

DR. BENJAMIN WEST FRAZIER, professor of mineralogy at Lehigh University, South Bethlehem, Pa., died January 4, of apoplexy, aged 64 years. After graduating from the University of Pennsylvania he studied in the Heidelberg and Paris universities, and went to Lehigh University in 1871 as professor of mining and metallurgy. He was a member of a number of scientific bodies.

JOHN CECIL PALMER, president of the Oil Well Supply Company, Pittsburgh, died suddenly January 7, aged 58 years. Mr. Palmer was born in Brooklyn, and his life had been one of extensive business activity. He was one of the best known oil operators in the United States, having entered the Bradford oil fields in the early 70's. Much of his time since then had been spent as an independent operator. About 1879 he became connected with the Oil Well Supply Company, and for many years the interests of the company were looked after by him in the districts of Jamestown, Bradford and Warren. Mr. Palmer is survived by his widow, one daughter and two sons.

GEN. WILLIAM HENRY POWELL, well known in the iron trade of the Central West and South, died last week at Belleville, Ill., after a long illness. He was born in South Wales 80 years ago and came to the United States as a child, his parents locating in Nashville, Tenn. General Powell erected the Virginia Iron & Nail Works, Benwood, Va., 50 years ago. He was subsequently general manager of nail mills at Ironton, Ohio, and Mason, W. Va. Later he was connected with the Belleville Nail Works and the Western Nail Works.

CHARLES W. WILKES, chief engineer for D. H. Burnham & Co., Chicago, Ill., died at Stratford-on-Avon, January 7. Many of the largest buildings in the country recently erected and now in course of construction were designed by Mr. Wilkes.

E. BENNER THOMAS, a well-known iron manufacturer of Pottstown, Pa., died January 7, aged 66 years. Mr. Thomas was identified with the Pottstown Iron Company, and in 1876 became superintendent of the mills of the Glasgow Iron Company, which position he held until his death.

WILLIAM ALVORD, a prominent capitalist of San Francisco, Cal., died recently from heart failure, aged 72 years. He was born in Albany, N. Y., and went to California in the early 50's. He established the iron and steel firm of William Alvord & Co. in Marysville, Cal., and subsequently opened offices in San Francisco.

PERSONAL.

A. K. Williamson, for more than 30 years paymaster for the National Tube Company of McKeesport, Pa., has resigned, and has been succeeded by Robert J. Caughey, who has been assistant paymaster for about 20 years.

Edward Moore, for several years connected with the Ohio Works of the Carnegie Steel Company, at Youngstown, Ohio, has been appointed assistant superintendent of the upper mills of the Carnegie Steel Company at Youngstown, Ohio.

Leonard Joseph, who has for a number of years been manager of the New York office of the Joseph Joseph & Bros. Company, will sail from New York the latter part of the present month for the purpose of taking a trip around the world. He expects to be absent for six months or more. Max L. Fechheimer, who has been connected with the company's main office in Cincinnati, will take charge of the New York branch at 100 Broadway during Mr. Joseph's absence. This company is one of the largest dealers in old material in the country, having offices in several of the leading cities as well as connections abroad.

Erasmus D. Leavitt, Cambridge, Mass., the well-known mechanical engineer, has been presented with a handsome silver service by 38 of his former associates from Boston, New York, Philadelphia, and other places, the occasion being his retirement from the more active duties of his profession. He will retain his position as consulting engineer of the Calumet & Hecla Mining Company and do some other work, but his greater activities will be relinquished. Among the notable work that Mr. Leavitt has done was his service as a consulting engineer of the Manhattan Elevated Railway when it changed from steam to electricity; the designing of the large pumping engines of the sewage plant at Dorchester, Mass.; the engines at the Chestnut Hill pumping station, the pumping engines of the Bethlehem 14,000-ton press and as a commissioner of the new Cambridge bridge.

Frank W. Hopkins has resigned as general manager of the Colorado Iron Works to accept charge of the Taylor Engineering Company's Works, New York. Mr. Hopkins is regarded in the West as one of the best informed men in smelting, mining and milling machinery.

Thomas K. Niedringhaus, general manager of the National Enameling & Stamping Company, St. Louis, Mo., has been nominated by the Republican members of the Missouri Legislature for United States Senator to succeed Senator Cockrell. The nomination is equivalent to an election.

The Iron and Metal Trades

Our monthly Pig Iron statistics are almost startling in the revelation they make of the enormous current consumption. The December product of Anthracite and Coke Iron was 1,614,000 gross tons, which the Charcoal Pig Iron output will carry to a total of 1,650,000 tons in 31 days. In spite of this very large output the stocks of the merchant furnaces declined 121,000 tons, thus indicating a rate of consumption, in a winter month, of over 1,750,000 tons. The active capacity increased from 357,846 tons on December 1 to 377,879 tons on January 1 or at the rate, including Charcoal Iron, of close to 20,000,000 tons per annum.

The Steel companies produced in December 1,019,841 gross tons of Pig Iron and will make more in January. How enormous the requirements are is shown by the fact that the Carnegie Steel Company, which operates 50 blast furnaces, has 47 in blast, and that another, the second Donora, is about to blow in. In spite of this the company is short of Pig Iron and is to-day closing purchases of 25,000 tons for January delivery.

The only reserve capacity of the United States Steel Corporation is in the Chicago district, which will be called upon, since the South Chicago plants are again in full operation.

In the principal distributing markets Pig Iron is rather quiet after the heavy buying of recent months. In Northern New York a railroad equipment company has increased a former order for 9000 tons to 15,000 tons at the same prices. In eastern Pennsylvania one lot of 10,000 tons of low phosphorus Iron was placed at a shade under $20, delivered, and several lots of Basic Pig, aggregating about 12,000 tons, have been marketed at prices varying from $16.50 to $16.75, delivered.

Pittsburgh reports a good deal of activity in the Steel market, with premiums over "official prices" universally prevailing on Billets and Sheet Bars. The Steel Corporation has been forced to start the Donora open hearth steel plant.

Further sales of Steel Rails to the extent of about 32,000 tons have been effected in the Chicago district, but otherwise the market is quiet. Up to January 1 the associated mills had sold 650,000 tons.

The Cast Iron Pipe trade has been quite active. New Orleans will contract for 13,000 tons, the Brooklyn order for 11,000 tons is virtually placed and the contract for 7000 tons for New York gas interests has been awarded.

From the West comes the report that a 16-inch pipe line 130 miles in length has been ordered from the leading interests.

The Structural mills have not taken much business since the opening of the year, but have a good deal of work in sight. In New York a local agreement relative to fabricated work has been terminated by the mills, but price cutting has been so general and so pronounced for some time past that the rupture is not likely to affect values to any extent.

The Coke trade has been exceedingly active, with rising prices. Deliveries have been more satisfactory.

A gentlemen's agreement has been reached by Lake Ore shippers fixing prices for Old Range Bessemers at $3.75, Mesaba Bessemer at $3.50, Old Range Non-Bessemer at $3.20 and Mesaba Non-Bessemer at $3.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Jan. 11, 1905.	Jan. 4, 1905.	Dec.14, 1904.	Jan. 13, 1904.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	**$17.50**	$17.50	$17.00	$14.70
Foundry Pig No. 2, Southern, Cincinnati	**16.25**	16.25	15.75	12.50
Foundry Pig No. 2, Local, Chicago	**17.50**	17.50	16.50	14.00
Bessemer Pig, Pittsburgh	16.85	16.85	16.85	13.85
Gray Forge, Pittsburgh	**16.25**	15.85	15.85	12.75
Lake Superior Charcoal, Chicago	**18.50**	18.50	17.50	16.75
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	**23.00**	22.00	21.00	23.00
Steel Billets, Philadelphia	25.00	25.00	25.00	24.25
Steel Billets, Chicago	**25.00**	25.00	24.00	24.00
Wire Rods, Pittsburgh	**31.00**	31.00	30.00	30.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	**16.00**	16.00	15.50	10.00
O. Steel Rails, Philadelphia	**17.75**	17.25	16.00	11.50
O. Iron Rails, Chicago	*21.00*	22.25	22.00	13.00
O. Iron Rails, Philadelphia	**22.50**	20.50	20.50	16.00
O. Car Wheels, Chicago	16.50	16.75	16.50	13.00
O. Car Wheels, Philadelphia	**16.00**	15.25	14.50	12.75
Heavy Steel Scrap, Pittsburgh	**16.50**	16.50	16.00	12.50
Heavy Steel Scrap, Chicago	**15.00**	15.00	14.25	10.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	**1.65**	1.63½	1.63½	1.35
Common Iron Bars, Chicago	1.65	1.65	1.65	1.32½
Common Iron Bars, Pittsburgh	**1.69¾**	1.69¾	1.54½	1.34¾
Steel Bars, Tidewater	**1.54½**	1.54½	1.44½	1.44½
Steel Bars, Pittsburgh	**1.40**	1.40	1.30	1.30
Tank Plates, Tidewater	**1.64½**	1.64½	1.54½	1.74½
Tank Plates, Pittsburgh	**1.50**	1.50	1.40	1.60
Beams, Tidewater	**1.64½**	1.64½	1.54½	1.74½
Beams, Pittsburgh	**1.50**	1.50	1.40	1.60
Angles, Tidewater	**1.64½**	1.64½	1.54½	1.74½
Angles, Pittsburgh	**1.50**	1.50	1.40	1.60
Skelp, Grooved Steel, Pittsburgh	**1.45**	1.45	1.40	1.50
Skelp, Sheared Steel, Pittsburgh	1.50	1.50	1.50	1.50
Sheets, No. 27, Pittsburgh	**2.20**	2.20	2.10	2.20
Barb Wire, Pittsburgh	2.20	2.20	2.20	2.50
Wire Nails, Pittsburgh	1.75	1.75	1.75	1.90
Cut Nails, Pittsburgh	1.75	1.75	1.75	1.79
METALS:				
Copper, New York	**15.12½**	15.12½	14.87½	12.75
Spelter, St. Louis	**6.15**	6.00	5.70	4.70
Lead, New York	4.60	4.60	4.60	4.45
Lead, St. Louis	4.52½	4.52½	4.55	4.20
Tin, New York	29.05	29.05	29.10	29.25
Antimony, Hallett, New York	*8.75*	8.75	9.00	6.50
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	**3.74**	3.74	3.64	3.79

Chicago.

FISHER BUILDING, January 11, 1905.—(*By Telegraph.*)

A very pronounced lull characterizes the market, but it is not accompanied by the feeling of weakness that attended similar periods of dullness during last spring and summer. In fact, the tone is strong and the tendency of prices is either stationary or upward. Pig Iron has neither advanced nor declined, but furnaces are not anxious to book business except at the highest ruling prices. The recent heavy snowfall in the Coke regions has so crippled the production and shipment of that commodity that blast furnacemen in the West are beginning to be alarmed lest a Coke shortage compel them to go out of blast. Actual trading in Pig Iron is extremely light, buyers being pretty well covered as to present requirements and not desirous of contracting for a period beyond the second quarter of the year. Billets are still held at a premium ranging from $1 to $2 on Bessemer and $2 to $4 on Open Hearth. None of the large Structural Steel contracts that are being figured on has been let. Another lot of 32,000 tons of Standard Section Rails has found its way to the books of the leading Western mill since last report, making about 285,000 tons entered since December 10. There is little activity in Structural Plates or Sheets. Pipe is moving well at the new prices. Inquiry is becoming very active for Cast Iron Pipe for delivery the coming spring. Old Materials show both advances and reductions, advances being somewhat in the majority.

Pig Iron.—In spite of light trading in all directions the market is firm, and one hears in every quarter predictions of higher prices before long. Blast furnaces have filled their books with orders extending so far into the year that their

attitude is one of indifference, except where they can secure the top prices from customers whose credit is undoubted. No large tonnages have been booked in the Western market within the week, and the jobbing foundry trade is evidently so well covered for current necessities that only small purchases are required in special lots. We quote:

Lake Superior Charcoal	$18.50 to $19.00
Northern Coke Foundry, No. 1	.... to 18.00
Northern Coke Foundry, No. 2	.... to 17.50
Northern Coke Foundry, No. 3	.... to 17.00
Northern Scotch, No. 1	18.00 to 18.50
Ohio Strong Softeners, No. 1	19.30 to 19.80
Ohio Strong Softeners, No. 2	18.80 to 19.30
Southern Silvery, 4 to 6 per cent. Silicon	18.65 to 19.65
Southern Coke, No. 1	.... to 17.65
Southern Coke, No. 2	.... to 17.15
Southern Coke, No. 3	.... to 16.65
Southern Coke, No. 4	.... to 16.40
Southern Coke, No. 1 Soft	.... to 17.65
Southern Coke, No. 2 Soft	.... to 17.15
Southern Gray Forge	.... to 16.50
Southern Mottled and White	.... to 15.90
Malleable Bessemer	.... to 17.50
Standard Bessemer	18.50 to 19.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	20.30 to 22.30
Jackson County and Kentucky Silvery, 10 per cent. Silicon	.... to 23.30
Alabama Basic	.... to 17.15
Virginia Basic	.... to 17.15

Old Materials.—Iron Rails and Angle Bars are weaker, with most of the other lines either stationary or slightly higher. The visible supply of Old Materials is apparently decreasing. The Santa Fé sold last week about 3000 tons and the Chicago & Northwestern less than 1000 tons. The prices received by these two roads and those ruling among dealers are approximately as follows, per gross ton:

Old Iron Rails	$21.00 to $21.50
Old Steel Rails, 4 feet and over	16.00 to 16.50
Old Steel Rails, less than 4 feet	16.00 to 16.25
Heavy Relaying Rails, subject to inspection	22.50 to 23.00
Heavy Relaying Rails, for side tracks	20.00 to 20.50
Old Car Wheels	16.50 to 16.75
Heavy Melting Steel Scrap	15.00 to 15.50
Frogs, Switches and Guards	15.00 to 15.50
Mixed Steel	10.00 to 10.50

The following quotations are per net ton:

Iron Fish Plates	$19.50 to $20.00
Iron Car Axles	23.00 to 23.50
Steel Car Axles	17.50 to 18.00
No. 1 Railroad Wrought	18.50 to 19.00
No. 2 Railroad Wrought	17.50 to 18.00
Shafting	17.50 to 18.00
No. 1 Dealers' Forge	14.50 to 15.00
Wrought Pipes and Flues	13.25 to 13.75
No. 1 Cut Busheling	12.50 to 13.00
Iron Axle Turnings	12.50 to 13.00
Soft Steel Axle Turnings	12.50 to 13.00
Machine Shop Turnings	12.00 to 12.50
Cast Borings	9.50 to 9.75
Mixed Borings, &c	9.50 to 9.75
No. 1 Mill	10.00 to 10.50
Country Sheet	8.50 to 9.00
No. 1 Boilers, cut to Sheets and Rings	12.50 to 13.00
No. 1 Cast Scrap	14.00 to 14.50
Stove Plate and Light Cast Scrap	11.50 to 12.00
Railroad Malleable	14.50 to 14.75
Agricultural Malleable	13.50 to 14.00

Metals.—Markets are strong with only a few changes. Casting Copper is unchanged at 15c. to 15⅛c., and Lake at 15¼c. to 15½c., both in car lots, with ¼c. higher for small lots. Lead is firm at 4.62½c. for 50-ton lots, 4.67½c. for car lots and 5c. to 5¼c. for small lots. Pig Tin remains at 30c. to 30½c. in car lots; Spelter at 6c. in car lots and 6½c. or above for small lots; Sheet Zinc is 25c. higher than last week, being now quoted at the basis of $7.50, f.o.b. Lasalle, in car lots of 600-lb. casks, which after deducting discounts and adding freight makes the price 7.25c., Chicago; small lots are sold at ¼c. to ½c. higher. We quote Old Metals as follows: Copper Wire, 13⅜c.; Heavy, 13¼c.; Copper Bottoms, 12c.; Copper Clips, 12¾c.; Red Brass, 11⅞c.; Red Brass Borings, 10c.; Yellow Brass, Heavy, 9c.; Yellow Brass Borings, 7⅞c.; Light Brass, 7¼c.; Lead Pipe, 4¼c.; Tea Lead, 4c.; Zinc, 4½c.; Pewter, No. 1, 19¼c.; Block Tin Pipe, 25.

(By Mail.)

Billets.—There is no change in the Billet situation, though there is apparently a little less difficulty in securing deliveries from the mills. Bessemer Billets, while officially quoted $24, are at an actual minimum of $25 for base size 16 square inches in section and larger up to but not including 100 square inches, and $27 for Bessemer Billets larger than 100 square inches in section. Open Hearth Forging Billets are held by all producers at from $28 to $32 a ton, in spite of the fact that the official price of $26 is nominally in force. Sheet and Tin Plate Bars are still held at premiums ranging from $1 to $3 a ton above official Billet pool price.

Rails and Track Supplies.—The leading Western mill has increased its bookings on Standard Section Rails to about 285,000 tons for shipment in 1905, and the orders on the books for Light Rails and Track Supplies are proportionately large. Prices are firm on the following basis: Standard Section Rails, $28 per gross ton, at mill, in 500-ton lots or greater, plus full freight to destination; Light Rails from $24 to $30, according to weight, in car lots, at mill; Angle Bars, 1.35c. to 1.40c., f.o.b. mill; Spikes, 1.70c. to 1.75c.; Track Bolts, 2.30c. to 2.45c. Store prices on Track Supplies range from 15c. to 20c. per 100 lbs. above mill prices.

Structural Materials.—Current business is light and mills apparently are making but little effort to increase it, as they seem well satisfied with the tonnage already booked. We quote: Beams and Channels, 3 to 15 inches, inclusive, 1.66½c.; Angles, 3 to 6 inches, ¼-inch and heavier, 1.66½c.; Angles, larger than 6 inches on one or both legs, 1.76½c.; Beams, larger than 15 inches, 1.76½c.; Zees, 3 inches and over, 1.66½c.; Tees, 3 inches and over, 1.71½c., with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Local jobbers quote the minimum price on Angles, Beams and Channels, 1.90c., with 10c. advance for 18, 20 and 24 inch Beams and for Angles larger than 6 inches on one or both legs. These prices are for either random lengths or cut to lengths, but 10c. to 15c. higher is charged for very small or wasteful odds.

Plates.—New business is extremely quiet, as all large producers seem to have covered their requirements well into the middle of the year. Specifications on contracts are reported as being highly satisfactory and sufficient to keep mills running to full capacity. Official prices at Chicago for shipment from mill in car lots are: Tank quality, ¼-inch and heavier, wider than 14 and up to 100 inches wide, carloads, Chicago, 1.66½c.; 3-16 inch, 1.76½c.; Nos. 7 and 8 gauge, 1.81½c.; No. 9, 1.91½c.; Tank quality, 14 inches wide to 6 inches, 10c. below these prices; Flange quality, any width up to 100 inches, 1.76½c.; Sketch Plates, in Tank quality, 1.76½c.; in Flange quality, 1.86½c. Store prices on Plates are as follows: Tank Plates, up to 100 inches wide, ¼-inch and heavier, 1.90c. to 2c.; 3-16 inch up to 72 inches wide, 2c. to 2.10c.; No. 8, up to 60 inches wide, 2c. to 2.10c.; lower gauges are quoted under the headings of Sheets. Beyond the base widths named extras from 10c. to 25c. per 100 lbs. are charged for wider widths; Flange quality is usually charged at 25c. extra.

Sheets.—The leading producer has evidently booked an enormous tonnage at the low prices prevailing last summer and fall, as efforts on the part of independent mills to secure new business develop the fact that the trade very generally has made contracts with the leading producer for larger tonnages than are ordinarily required at from 2c. to 2.10c., Pittsburgh, for No. 28. The present high prices on Sheet Bars make it impossible for independent mills to make any inducements below the 2.30c. basis, and indeed this basis is extremely low in terms of present prices of Billets and Sheet Bars. Independent Tin Plate mills are encountering much the same difficulties. Prices at Chicago for shipment from mill in car lots are as follows: Nos. 9 and 10, 1.81½c.; Nos. 11 and 12, 1.86½c.; Nos. 13 and 14, 1.91½c.; Nos. 15 and 16, 1.96½c.; Nos. 18 and 20, 2.21½c.; Nos. 22 and 24, 2.26½c.; Nos. 25 and 26, 2.31½c.; No. 27, 2.36½c.; No. 28, 2.46½c.; No. 29, 2.61½c.; No. 30, 2.71½c. Store prices rule as follows: Blue Annealed Sheets, No. 10, 2.05c. to 2.15c.; No. 12, 2.10c. to 2.20c.; No. 14, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c.; Nos. 18 and 20, 2.45c. to 2.50c.; Nos. 22 and 24, 2.50c. to 2.60c.; No. 26, 2.55c. to 2.65c.; No. 27, 2.60c. to 2.70c.; No. 28, 2.70c. to 2.80c. Galvanized Sheets, while not officially advanced, rule higher in tone and in some instances the prices have been advanced. The official prices remain as follows, f.o.b. Chicago, in car lots: No. 16, 2.61½c.; Nos. 18 and 20, 2.76½c.; Nos. 22 and 24, 2.91½c.; No. 26, 3.11½c.; No. 27, 3.31½c.; No. 28, 3.51½c. These prices range from 75, 10 and 10 at Pittsburgh in the heavier gauges to 80 and 2½ in the lighter. Store discounts on Galvanized Sheets range as follows, f.o.b. Chicago warehouse: Nos. 10, 12 and 14, 75 per cent. to 70 and 10; No. 15, 75 and 2½ to 70, 10 and 5; Nos. 18 and 20, 75 and 7½ to 75; No. 22 and lighter up to 36 inches wide at 75 and 10 to 75 and 2½; all Sheets more than 36 inches wide in any gauge are held at a minimum of 70 and 10 and range from there to 70 and 5 discount.

Bars.—Specifications on contracts continue to come in at a rate that is highly satisfactory to the mills. New business is conspicuous for its scarcity, as nearly all buyers covered their requirements well into the future before the recent advance. The reduction of Open Hearth Bars to the Bessemer basis and the high prices of Scrap are together giving the independent Open Hearth Bar mills some anxious moments. Meanwhile the large producers of Bessemer Bars are four to six weeks behind their orders. Bessemer and Open Hearth Steel Bars are firm at 1.66½c., base, half extras, Chicago, in car lots; Iron Bars at 1.65c., base, half extras, in car lots; Soft Steel Hoops at 1.71½. rates, full extras, in car lots; Soft Steel Angles, Channels, Tees and Shapes belonging to the Bar class, 1.76½c., half extras, Chicago, in car lots. Quantity differentials are added to the regular extras for size and for less than car lots, as follows: Less than 2000 lbs. down to 1000 lbs. of a size, 10c. extra;

less than 1000 lbs. of a size, 30c. extra. Store prices on Bars are 1.75c., minimum, for both Iron and Steel, with half extras on Steel and full extras on Iron, with 1.85c., minimum, half extras, on Angles and Shapes, and 2.10c., minimum, full extras, on Steel Hoops.

Merchant Steel.—Very little new business is being offered and mills are not disposed to force the situation, as they are well filled up with contracts. Specifications are good and the demands on the mills at the present time are well up to their capacity to supply. We quote: Open Hearth Spring Steel is being held at 2c., Chicago, to the general trade. Other prices, based on the new Bar schedule of December 20, are: Smooth Finished Machinery Steel, 1.81½c.; Smooth Finished Tire, 1.76½c.; Flat Sleigh Shoe, 1.61½c.; Concave and Convex Sleigh Shoe, 1.76½c.; Cutter Shoe, 2.30c.; Toe Calk Steel, 2.11½c.; Railway Spring, 1.76½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up. Shafting is unchanged for the present at 52 per cent. discount in car lots and 47 per cent. in less than car lots in base territory.

Merchant Pipe.—Somewhat of a lull has followed the promulgation of the $1 advance January 2, as the buyers pretty generally seem to have been permitted to cover before the advance was made. Present official prices, Chicago, in car lots to consumers are:

	Steel.		Iron.	
	Black. Per cent.	Galv. Per cent.	Black. Per cent.	Galv. Per cent.
⅛ and ¼ inch	66.85	50.85	64.85	48.85
⅜ and ½ inch	70.85	58.85	68.85	56.85
¾ to 6 inches	74.85	64.85	73.35	63.35
7 to 12 inches	69.85	54.85	68.35	52.85
Extra strong, plain ends, ⅛ to ⅜ inch	59.85	47.85	57.85	45.85
½ to 4 inches	66.85	54.85	64.85	52.85
4½ to 8 inches	62.85	50.85	60.85	48.85
Double extra strong, plain ends	55.85	44.85	53.85	42.85

Boiler Tubes.—Notwithstanding published reports to the contrary there has been no change made in the price of Boiler Tubes, the present prices being the same as have prevailed since early in November.

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches	44.35	41.35	52.35
1¾ to 2¼ inches	56.35	41.35	40.35
2½ inches	58.35	46.35	43.35
2¾ to 5 inches	64.35	53.35	up to 4 in. 50.85
6 to 13 inches	56.35	41.35	....

While the car lot discount is officially only two points better, actual business is being transacted with independent mills at the following basis for car lots, Chicago:

	Steel.	Iron.	Seamless Steel.
1 to 1¼ inches	50	42	55
1¾ to 2¼ inches	62	45	48
2½ inches	64	50	49
2¾ to 5 inches	70	57½	52½

The same price can be obtained at mill in less than car lots, plus the excess freight, for delivered price. Store prices on Boiler Tubes are fairly well maintained:

	Steel.	Iron.	Seamless Steel.
1 to 1¼ inches	42½	37½	40
1¾ to 2¼ inches	52½	35	37½
2½ inches	55	37½	40
2¾ to 5 inches	62½	47½	47½
6 inches and larger	52½	..	..

Cast Iron Pipe.—Owensboro, Ky., has taken bids on about 3000 tons, but has not yet announced its awards. Independence, Kan., has bought 1500 tons from the leading producer. Deadwood, S. D., postponed its letting until January 25. Los Angeles, Cal., will open bids January 16 for 2920 tons of 4 to 12 inch Pipe. New Orleans, La., will open bids for 13,000 tons January 31. Sioux Falls is also in the market. Foundries are all running full capacity and the tone of the market is strong. Prices are unchanged, as follows: $28.50 a gross ton for 4-inch Water Pipe and $27.50 for 6-inch and larger, with $1 extra for Gas Pipe.

Coke.—Recent blizzards which have visited the Coke regions have very greatly stiffened prices and led to the fear that an actual famine may result. Connellsville Foundry Coke is offered at from $5.40 to $5.65 for strictly 72-hour Foundry, and about 25c. less for Furnace quality. West Virginia Cokes are quotable at about $2.50 at the ovens or $5.15, Chicago. Wise County, Va., Cokes can be had at from 4.50 to $4.75, Chicago. With the relief in the water famine comes an aggravation of the car famine, but it is not observed that any user of Coke has failed to relieve his actual necessities in the market.

The Machine Knife Association will hold its annual meeting at the Murray Hill Hotel, New York, on the 12th, 13th and 14th inst. Among the members are A. A. Simonds & Co., Dayton, Ohio; Simonds Mfg. Company, Fitchburg, Mass.; D. E. Lovejoy, J. Loyd Company, New York, and L. & I. J. White, Buffalo.

Philadelphia.

FORREST BUILDING, January 10, 1905.

Business has hardly opened up since the beginning of the new year, so that it is not possible to discuss the situation with any great degree of confidence. In some lines there is an appearance of strength, with slightly higher prices; in others there is hesitancy, which if not broken inside of the next two or three weeks may result in a temporary reaction. The feeling in the trade is not entirely one sided, except that a large business is expected, but there is a good deal of uncertainty as to its extent and in regard to the prices at which it will be done. Manufacturers in all lines feel that they have as much business as they want at last month's prices, while consumers feel that for the present they have enough iron bought to obviate the necessity of further purchases if advanced prices are asked. Consequently business is rather quiet, manufacturers figuring on costs and consumers on what tonnage they are likely to require during the first half of the year and what they may have to pay for it. This by no means indicates a less favorable outlook, but it does involve hard thinking and close figuring. Consumers of Pig Iron argue that prices ought to shade off a little. The Coke situation is better, and the output of Pig Iron in January is expected to be larger than during even the best month of 1904. Moreover, it is argued that, fearing a scarcity during the earlier months of the year, orders were given for a tonnage one-third larger than they really expected to use; consequently with better conditions for producing pig iron there may be more, rather than less, iron than will be required during the first few weeks of the new year, if not beyond that time. This opinion has been partly confirmed by the somewhat free offerings of Pig Iron for prompt shipment, with a possibility that this may become more general in course of the next few weeks. This does not by any means imply that business is likely to be disappointing. There has been so much new work taken on during the past few weeks that there is bound to be great activity in the near future, besides which the amount in sight is very large. But it comes on a bare market and with a much larger productive capacity than ever before, so that even a great increase in the demand can be handled with comparative ease. This will probably prevent any marked advance in prices, and as regards Pig Iron may possibly cause a slight reaction, as the advance has been somewhat disproportionate compared with finished products. This, of course, is merely a theory, although indications are not wanting along the lines mentioned. It is too soon, however, to get things down to a very fine point; all that appears to be absolutely certain is that the volume of business will be large and prices not likely to go much, if anything, below to-day's figures, and even then it would be very temporary.

Pig Iron.—The market has hardly got started as regards new business, although there is a good deal of inquiry, particularly for the second quarter. Sellers quote full prices and are by no means anxious for business so far ahead, but there is no great difficulty in getting January Iron, and in some cases at rather less money than would have been demanded a month ago. This should cause no surprise, as, fearing that there might be a scarcity of Iron, buyers stipulated for excess quantities, which it now appears will not be wanted. There is no particular significance in this, as the underlying conditions make it reasonably certain that all the Iron made will be required during the next few months. Work is coming out in so many lines and so heavily that a consumption at the rate of 20,000,000 tons for the year is confidently figured on, so that a little dullness during the first half of the first month in the year is of no significance. Temporarily it may check any further advance in prices, but that will not be a bad thing until costs are adjusted in accordance with the new conditions. It may be necessary to make a new list of prices, but for the present business is being done at about the following quotations for Philadelphia and nearby deliveries:

No. 1 X Foundry	$17.75 to $18.00
No. 2 X Foundry	17.50 to 17.75
No. 2 Plain	16.75 to 17.00
Standard Gray Forge	16.25 to 16.50
Ordinary Gray Forge	15.25 to 15.50
Basic	.... to 16.50
Low Phosphorus	20.00 to 20.25

Steel.—There is a good demand for Steel and prices are very strong, $25 being an inside figure for large lots, with the usual addition on small lots and special qualities.

Muck Bars.—The market is strong at $29.50 to $30, f.o.b. seller's mill. Sales were made last week at $29, but holders now ask more money.

Plates.—Business is much better than it was some time ago, and a very fair line has been taken since the advanced prices went into effect. There is still a good deal of business in sight, and mills are more generally employed than for months past, so that the new year begins with prospects of a most favorable character. Prices unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, over 14 inches wide	1.63½	1.68½
Tank, Bridge and Boat Steel, rectangular Plates, 14 inches wide and under	1.53½	1.58½
Flange or Boiler Steel	1.73½	1.78½
Marine, A. B. M. A. and Commercial Fire Box Steel	1.83½	1.88½
Still Bottom Steel	1.93½	1.98½
Locomotive Fire Box Steel	2.13½	2.18½

The above are base prices for ¼-inch and heavier. The following extras apply:

	Per 100
3-16-inch thick	$0.10 pounds extra.
Nos. 7 and 8, B. W. G.	.15 "
No. 9 B. W. G.	.25 "
Plates over 100 to 110 inches	.05 "
Plates over 110 to 115 inches	.10 "
Plates over 115 to 120 inches	.15 "
Plates over 120 to 125 inches	.25 "
Plates over 125 to 130 inches	.50 "
Plates over 130 inches	1.00 "

Beams and Channels, up to 15 inches	1.63½
Over 15 inches	1.73½
Small Angles	1.63½
Large Angles	1.73½
Steel Bars	1.63½
Refined Iron	1.63½ to 1.68½

Structural Material.—There is nothing of special importance in this department, but employment is full and general and prospects are unusually good for its continuance. Prices are now quoted as follows: Beams, Channels and Angles, 1.63½c. to 1.75c., according to specifications, and small Angles, 1.55c. to 1.60c.

Bars.—This department of the Iron and Steel trade has developed unusual activity. Mills are mostly on full time and specifications come in very freely, with a great deal of inquiry for new lots. Prices are strong, some quoting 1.75c. delivered, and there are few, if any, that would go below 1.65c. for Refined Iron. Steel Bars are also taken very freely, but it is difficult to place orders at the official figures of 1.53½c. The activity in Bars is something unusual, but they are simply following the advance in cost and the improved conditions which have developed along the entire line.

Sheets.—There is a good deal of activity, prices showing decided firmness and a tendency toward an advance on spring deliveries.

Old Material.—The situation is extremely difficult to define. Those who must have material are compelled to pay very full prices, but holders are so tenacious that it seems impossible to get prices anywhere near to buyers' views. The outside quotations herewith represent what sellers ask; the inside are what buyers have paid or are willing to pay. Sales here and there have been made at medium figures, but to-day's bids and offers would be about as follows:

Old Steel Rails	$17.75 to $18.00
No. 1 Steel Scrap	17.50 to 18.00
Old Steel Axles	20.00 to 20.50
Old Iron Axles	23.00 to 24.00
Old Iron Rails	22.50 to 23.00
Old Car Wheels	16.00 to 16.50
Choice Scrap, R. R. No. 1 Wrought	20.50 to 21.00
No. 1 Yard Scrap	19.00 to 19.50
Long and Short	18.25 to 18.75
Machinery Scrap	16.00 to 16.50
Low Phosphorus Scrap	21.00 to 22.00
Wrought Iron Pipe	16.00 to 16.50
No. 1 Forge Fire Scrap	16.50 to 17.00
No. 2 Forge Fire Scrap, Ordinary	11.50 to 12.00
Wrought Turnings	14.50 to 15.00
Wrought Turnings, Choice, Heavy	16.00 to 16.50
Cast Borings	11.00 to 11.50
Stove Plates	14.00 to 14.25

Cincinnati.

FIFTH AND MAIN STS., January 11, 1905.—(*By Telegraph.*)

Pig Iron.—The market is still feeling the effects of the holiday season. This is especially noticeable in the absence of any large transactions during the week, as well as the lack of what might be termed *bona fide* inquiries. There is however, nothing to indicate any signs of weakness in the situation, the concensus of opinion being that higher prices are to obtain within the next few weeks. That there should be a lull in the buying movement after the large tonnage that was sold during November and December is not to be wondered at, and conditions as they now exist are but natural and healthful to a large degree. What buying has been done during the week has for the most part come from the rank and file in small lots suitable to their present requirements of from 100 to 200 tons. The larger concerns in most instances anticipated their needs and secured their Iron a month or so since. This supply from present indications will be exhausted in a short time, when they will be an important factor in causing the market to resume its former activity. Reports from car wheel manufacturers indicate that they are being rushed with work, as is also the case with car shops, locomotive builders and industries of a similar nature. We learn of one special sale of Southern No. 2 for which the purchaser paid $13.75, Birmingham, but the tonnage was so small that no cognizance can be taken of the sale in establishing quotations; $13.50 is the ruling basis, and at this figure the market is strong and firm. Northern No. 2 is unchanged as to price and is holding at from $16 to $16.50, furnace. Gray Forge and the other low grades are still scarce and the ruling quotations for these grades are very strong. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	.... to $16.75
Southern Coke, No. 2	.... to 16.25
Southern Coke, No. 3	.... to 15.75
Southern Coke, No. 4	.... to 15.50
Southern Coke, No. 1 Soft	.... to 16.75
Southern Coke, No. 2 Soft	.... to 16.25
Southern Coke, Gray Forge	.... to 15.25
Southern Coke, Mottled	$14.75 to 15.00
Ohio Silvery, No. 1	19.15 to 19.65
Lake Superior Coke, No. 1	17.65 to 18.15
Lake Superior Coke, No. 2	17.15 to 17.65
Lake Superior Coke, No. 3	16.65 to 17.15

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$18.50 to $19.00
Lake Superior Car Wheel and Malleable	18.00 to 18.50

Coke.—The Coke situation remains practically unchanged, so far as supply and demand is concerned. The heavy snows that now envelop the plants are retarding the production to a great degree. This, in conjunction with a congested condition of affairs in the Pittsburgh district, is productive of much delay and inconvenience on the part of both operators and consumers. As a result prices have advanced quite perceptibly during the week, the best grades of Connellsville Foundry selling at from $3 to $3.25, f.o.b. ovens.

Plates and Bars.—A fairly normal condition prevails, the mills as a rule being sold far into next year. It is anticipated that the year will bring an exceedingly heavy demand for Finished Material in all its varied forms. Prices are unchanged since last report. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.53c., with half extras; the same in smaller lots, 1.75c., with full extras: Base Angles, 1.63c., in carload lots; Beams and Channels, in carload lots, 1.63c.; Plates, ¼-inch and heavier, 1.63c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, ¾ x 3-16 and heavier, 1.73c., in carload lots.

Old Material.—Dealers say that while there is nothing of special interest transpiring, the tone of the market is strong and active and looks very promising. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, $17 to $18 per net ton; No. 1 Cast Scrap, $14 to $14.50 per net ton; Iron Rails, $21.50 to $22 per gross ton; Steel Rails, rolling mill lengths, $14.50 to $15 per gross ton; Relaying Rails, 56-lb. and upward, $23 per gross ton; Iron Axles, $21 to $22 per net ton; Car Wheels, $15 to $16 per gross ton; Heavy Melting Scrap, $14.50 to $15 per gross ton; Low Phosphorus Scrap, $17 to $18 per gross ton.

Birmingham.

BIRMINGHAM, ALA., January 9, 1905.

There has been practically no change in the Iron market. The demand has been of only a moderate character, with little disposition manifested by either side to open the ball for this year. Each seems to be waiting for the other to show his hand. There has been some feeling of the market, but it has been as a rule for lots that range only as high as 500 tons, and thence down to car lots.

It is hard to quote the market correctly. A buyer who has the advantage of competitive selling markets can probably buy some No. 2 Foundry at $13.75, if he has tact. But all have marked up the price of that grade to $14, and there is probably more selling at that price than below it. During the week there were sales at $14, at $13.75 and, in at least one case, it sold at $13.50. When one asks why this difference the answer is competition and other reasons satisfactory to the seller. None of the orders sold were of any magnitude, Some Iron was wanted high in silicon and brought a premium over extreme quotations. But such sales were very limited. No. 1 Foundry and No. 1 Soft sold at $14.50, delivery during this quarter. The largest sale reported was for 500 tons No. 1 Foundry, delivery in March, at $14.50. There was some call for Gray Forge and No. 3 Foundry, but there is considerable difficulty in obtaining these grades even in small amounts. Practically the market is bare of them. Gray Forge is quoted at $12.75, and No. 3 Foundry is sometimes 25c. and sometimes 50c. above Gray Forge. There were a few sales for delivery the second quarter on the basis of current values now prevailing.

The problem that is now giving the furnace interests serious thought is the delivery, as they mature, of Iron sold. It is going to be a close shave with some of them to say "All is well" when time is up. All the efforts and influence that can be brought to bear will be exerted by the furnace interests to prevent the market from going above

$15 for No. 2 Foundry. There will be no effort to boom prices. The trouble will be to restrain buyers who, in times of scarcity, bid prices above current value.

We are showing no improvement in the way of output and it still looks as if we won't during this quarter. We have several furnaces banked for various causes, and there are more that will have to bank their fires in a very little while. The outlook in this respect is anything but encouraging. The officials of the United Order of Mine Workers gave notice some days ago that the assessment of $1 per week levied upon those members at work to support those not at work was reduced to 50c. per week on account of the favorable condition of the treasury. They claim that their condition is fine and that they are making steady progress in their fight. The operators report that not a day passes that applications are not received from members of the union for employment in their mines. Results are proof positive of the situation and your correspondent saw mine reports from some of the mines showing that they had returned to normal conditions as to output. But this does not apply to all the mines. It can, though, be taken as a guide to the progress made in getting back to normal conditions. The operators have information to the effect that the dissatisfaction among the striking miners is on the increase and that the union will soon be a thing of the past as far as this district is concerned.

The Atlas Coal Company, capital $100,000, filed articles of incorporation the past week. Its field will be in Walker County. The incorporators are R. C. Middleton, who is president; J. H. Hayes, who is treasurer, and A. P. London.

There is something doing in the opening of fresh ore mines. In the Bessemer territory the Martin Mineral Mining Company has entered the field and will open up some red ore veins, working 250 hands if it can get them.

The capitalization of industries launched during the past year foots up $6,000,000, a clear gain of over $1,000,000 on the preceding year.

There is something brewing in the way of a consolidation of strong interests, but nothing definite concerning the progress of negotiations can as yet be obtained.

The Wilkinson Turbine Company has established headquarters here.

Cleveland.

CLEVELAND, OHIO, January 10, 1905.

Iron Ore.—There have been but few developments in the Iron Ore situation during the week. The market has grown somewhat stronger, due in part to the seeming anxiety of some of the furnacemen to cover their needs for Ore for the ensuing year. There have been a few sales, running about 75c. a ton higher than the prices which prevailed last year, but these have been small and mostly of non-Bessemer.

Pig Iron.—The buying of Foundry Pig Iron is a little quiet at present. The market has about been stocked for the first quarter and there is some hesitancy about buying for the second quarter on the basis of present prices. There is some fear that the bounds have been overstepped in the matter of advances. There is a slight tendency toward an increased melt, and this is being shown in the heavy shipments against old orders. The price which is generally quoted is $16.50, at the furnace, for No. 2, with some furnaces getting $17. This price is also asked on contracts running through the second quarter and has been obtained in a few instances on orders to be shipped after July 1, but all such sales are small. The Coke market is much stronger than it has been. The snow in the Pittsburgh and West Virginia territories has retarded the movement, which has been complicated by something of a car shortage. Good 72-hour Foundry Coke is now worth $3.25 for spot shipment, with contracts being made at $3 to $3.25 at the oven. The best Furnace Coke has been selling at $3 for spot shipment, with contracts running $2.75 to $3.

Finished Iron and Steel.—The market is strong as to sentiment, but rather sluggish as to new business. There is a certain letting up of buying, which is ordinarily expected this time of the year. But the specification against old contracts has been exceptionally heavy, and the mills are not wanting in business to keep them going. The two strong features of the market in Cleveland are Billets and Light Rails. Billets have been aggressively strong. Some small sales have been made during the past few days of Open Hearth Billets, 4 x 4 and 4 x 6, as high as $30, Cleveland. The association price is $21, Pittsburgh. There has also been a steady demand for Forging Billets, and the strength of the market has been shown by the fact that they have been quoted $3 higher than the base grades. There is also some difficulty to get Light Rails. The demand is strong for all sizes of Light Rails, and the best that can be offered in the way of delivery is from six to eight weeks, with an eager demand for them in that length of time. The prices are aggressively strong on the basis provided by the association. The traction lines, which are planning to extend their tracks during the coming year, have not started in to order standard Rails as yet. That business is in consequence rather light. The new orders in Structural and Plates have been few. The consumers have been specifying against their contracts, however, very freely, and the movement from the producer to the consumer has been in consequence rather free. Prices have not changed, but they have not influenced the trade as much as seasonal conditions. The Plate quotations are 1.40c., Pittsburgh, up to 14-inch and 1.50c., Pittsburgh, for 14-inch and up. The quotations on Structural are 1.50c. to 15-inch and 1.60c., Pittsburgh for 15-inch and up. The Sheet trade has been fairly strong, with a moderate business, but without any change of prices. The best part of the market is the specifying against old contracts. Prices hold at 2.40c. out of stock for Nos. 22 to 24 Black Sheets and 2.10c. for the same gauge in car lots at the mill, both being base prices. There is fair buying of Bar Iron and the price is a little stronger, due to the aggressive attitude of the Scrap trade. The ruling price now ranges between 1.65c. and 1.70c., Youngstown. The market for Bar Steel is still about as it has been. There are some good specifications against old contracts, and the new orders are coming in in small amounts. The trade is steady, but not especially buoyant.

Old Material.—The Scrap market has held out against the endeavor of the buyers to break prices, and these have even advanced a little. There has been good buying by mills, but this has not been up to the standard of the past few weeks. We revise and quote, all gross tons: Old Steel Rails, $16 to $16.50; Old Iron Rails, $25; Old Car Wheels, $17; Heavy Melting Steel, $16 to $17. All net tons: Cast Borings, $8; No. 1 Busheling, $15; No. 1 Railroad Wrought, $19 to $20; Iron Car Axles (nominal), $20 to $21; No. 1 Cast, $14.50; Stove Plate, $11 to $12; Iron and Steel Turnings and Drillings, $12.50 to $13.

Pittsburgh.

PARK BUILDING, January 11, 1905.—(*By Telegraph.*)

Iron Ore.—We can state that fully 1,000,000 tons of Ore have been sold for this year's delivery by several of the leading Ore producers to merchant blast furnaces. A "gentleman's agreement" has been reached fixing prices on Ore for this year as follows: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.50; Old Range Non-Bessemer, $3.20; Mesaba, Non-Bessemer, $3. The guaranty on the Bessemer Ores is 56.70 per cent. natural and phosphorus 0.45 per cent. The guaranty on the non-Bessemer Ores is 52.80 natural. It is understood that these prices have been guaranteed against decline, and the prices as adopted for this year are practically the same as those in force two years ago.

Pig Iron.—While there are some fair inquiries, no large sales have been made. At this time it is unknown whether the United States Steel Corporation will buy any Bessemer Iron for January shipment. A good deal of speculative Iron is hanging over the market, and, in the absence of inquiries, this is having the effect of softening prices to a slight extent. A good deal more Iron is being offered than buyers can be found to take, and while the market to-day on Bessemer Iron is fairly strong at $16, Valley furnace, on a firm offer this price might be slightly shaded. One sale of Bessemer Iron has been made at $15.85, Valley furnace, but it is understood this Iron had to be moved. The demand for Foundry Iron is rather quiet, with prices only fairly strong. We quote Northern brands of No. 2 at $16 to $16.25, Valley furnace, equal to $16.85 and $17.10, Pittsburgh. We note some heavy sales of Forge Iron in the past week, one local consumer buying upward of 12,000 tons or more, about equally divided between Northern and Southern Iron. The price of the Southern Iron was $13.50, Birmingham, equal to $17.85, Pittsburgh. The Northern Iron was on the basis of $15.40, Valley, or $16.25, Pittsburgh, and amounted to about 6000 tons. We also note sales of about 1500 tons of Northern No. 2 Foundry Iron at about $16, Valley furnace.

Steel.—We note a very active market, and consumers who have Billets and Sheet and Tin Bars due them are having trouble in getting deliveries. Some of the Steel mills seem to be badly oversold and are also short of metal, and for these reasons are falling down on deliveries. Bessemer and Open Hearth Billets for reasonably prompt shipment readily bring $23 or higher, and Sheet and Tin Bars $25 and upward. Official prices on Billets and Sheet and Tin Bars are no longer observed in the new tonnage being placed, for which consumers have to pay premiums of several dollars a ton.

(*By Mail.*)

Negotiations that have been pending with the United States Steel Corporation for nearly a week on a purchase of Bessemer Pig Iron for January delivery have not as yet resulted in anything definite. The matter will be decided within the next day or two, and there seems to be no question that the Carnegie Steel Company is badly in need of Pig Iron, as this week two of the cupolas at the Duquesne Steel Works and three at the Homestead Steel Works have

been shut down for want of Iron. It is also true that the Duquesne Steel Works is running only single turn for lack of metal. It is reported that the Steel Corporation objects to paying $16 for Iron, which is the price asked by the furnace owners. Should the Steel Corporation buy a round tonnage of Iron for January shipment it would no doubt have the effect of stiffening up the market a good deal, and possibly result in an advance in prices. The Pig Iron market has been rather quiet the past week, and no sales of magnitude are reported. The Carnegie Steel Company has started one Donora furnace, and will get the other one going this month. Bessemer and Basic Pig Iron are very firm at $16 to $16.25, Valley furnace. Northern No. 2 Foundry is also quite firm at $16.50 to $17, at Valley furnace, but inquiries are rather light. No large sales of Forge Iron have been made, Northern brands being quite firm at about $15, Valley furnace, or $15.85, Pittsburgh.

We note great activity in the Steel market, and consumers who have Billets, Sheet and Tin Bars due them are having much trouble in getting deliveries. The Carnegie Steel Company is the principal producer of Sheet and Tin Bars, and owing to shortage in metal is considerably behind in making deliveries. Official prices of Billets and Bars are no longer regarded in new business, Bessemer and Open Hearth Billets readily bringing $22 to $23 and Sheet and Tin Bars $25 and upward for reasonably prompt delivery.

In Finished Iron and Steel there has been something of a lull in the demand in the past two weeks, but this is not unusual at this season of the year. This lull is also partly due to the fact that consumers bought heavily before the recent advances in prices were made and are therefore pretty well covered for some little time ahead. At present there is no weakness in prices, but inquiries are not as plentiful as they were during the early part of December. There have been no changes in prices during the week, with the exception of Chain, which was advanced $2 a ton at a meeting of the principal makers held in this city to-day.

Ferromanganese.—We note a sharp advance in prices of Ferro, which is now held at $45 to $45.50 in carlaods and larger lots for 80 per cent. English and domestic. We note a sale of 100 tons of English Ferro at $45, delivered.

Rods.—The high prices and scarcity of Billets are having the effect of putting up prices of Rods, which are very firm and for which we note considerable inquiry. Bessemer and Open Hearth Rods are held at $31 to $31.50, Pittsburgh, and we are advised that one or two sellers are asking $32 and even higher. The principal producer of Rods is practically out of the market as a seller.

Skelp.—The continued active demand for Pipe is reflected in Skelp, for which the mills are having good inquiries and are practically sold up for several months. Prices are very firm and we note the fact that some sellers are asking higher prices. We quote: Grooved Iron Skelp, 1.60c. to 1.65c.; Sheared, 1.65c. to 1.70c.; Grooved Steel Skelp, 1.45c. to 1.50c., and Sheared, 1.50c. to 1.55c. These prices are for ordinary widths and gauges, f.o.b. cars maker's mill, terms 30 days, less 2 per cent. for cash in 10 days.

Muck Bar.—No large sales have been made in the past week, but prices are firm and we quote best grades of Muck Bar, made from all Pig Iron, at $28 to $28.50, Pittsburgh.

Steel Rails.—There has been some activity in Rails in the past week. The Vanderbilt roads have placed about 100,000 tons, equally divided between the Lackawanna Steel Company, in which the Vanderbilts are interested, and the Steel Corporation. Other smaller roads have placed upward of 50,000 tons, and it would seem that the long expected activity in Steel Rails was about to be realized. The Rail Association for 1905, which includes the seven leading producers, is now on a strong basis, the Lackawanna Company receiving its allotment of 15 per cent. Prices on Light Rails have further advanced and these are now held at $24 to $27, depending on weight. We quote Standard Sections at $28 at mill, the mills equalizing freights.

Structural Material.—A good deal of bridge work and also some large structures are in the market, some of which tonnage will likely be closed within a short time. We quote: Beams and Channels, up to 15-inch, 1.50c.; over 15-inch, 1.60c.; Angles, 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.50c.; Angles, 8 x 8 and 7 x 3½ inches, 1.60c.; Zees, 3-inch and larger, 1.50c.; Tees, 3-inch and larger, 1.55c. Under the Steel Bar Card Angles, Channels and Tees under 3-inch are 1.50c., base, for Bessemer, and 1.55c., base, for Open Hearth, subject to half extras on the Standard Steel Bar Card.

Plates.—While a moderate tonnage is being placed in Plates, it is not as large as anticipated and the situation is rather disappointing. Some of the leading consumers bought heavily before the advance in prices last month and are therefore out of the market until this material has been used. A better demand for Plates is confidently expected in the near future and it is claimed official prices are being firmly held. We quote: Tank Plate, ¼-inch thick, 6¼ to 14 inches wide, 1.40c., base; over 14 inches wide and up to 100 inches in width, 1.50c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16 inch Plates on thin edges	$0.10
Gauges No. 7 and No. 8	.15
Gauge No. 9	.25
Plates over 100 to 110 inches	.05
Plates over 110 to 115 inches	.10
Plates over 115 to 120 inches	.15
Plates over 120 to 125 inches	.25
Plates over 125 to 130 inches	.50
Plates over 130 inches	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
Marine, "A. B. M. A." and ordinary Fire Box Steel Plates	.20
Still Bottom Steel	.30
Locomotive Fire Box Steel	.50
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum, and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast not included.

Sheets.—We note an active demand for both Black and Galvanized Sheets and the mills are fairly well filled up. There is still much complaint from independent Sheet mills over tardy deliveries of Sheet Bars, which prevent the filling of orders promptly. Prices of Sheets are unchanged, but are very firm and we quote: No. 24, box annealed, one pass through cold rolls, 2.05c.; No. 26, 2.15c.; No. 27, 2.20c., and No. 28, 2.30c. We quote Galvanized Sheets as follows: Nos. 22 and 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.13c.; No. 28, 3.35c. We quote No. 28 Gauge Painted Roofing Sheets at $1.65 per square, and Galvanized Roofing Sheets, No. 28 Gauge, at $2.85 for 2½-inch corrugation. Jobbers charge the usual advances over above prices for small lots from store.

Iron and Steel Bars.—A moderate amount of new tonnage is being placed, but not quite as heavy as the mills would like to see it. Most large consumers bought heavily prior to the advance in prices last month and are therefore out of the market for the time being. The high prices of Iron Bars are causing some consumers of these to go back to Steel Bars, which are nearly $4 a ton cheaper. The mills have a fair amount of work ahead of them and the next two or three months promise to be quite active unless there should be a slump in demand, which is hardly likely. We quote Iron Bars at 1.65c., Youngstown, or 1.69¾c., Pittsburgh. We quote Bessemer and Open Hearth Steel Bars at 1.40c., base, for carload lots, with the usual advances for small lots.

Hoops and Bands.—The tonnage in Steel Hoops is fairly heavy and we quote at 1.55c., f.o.b. at mill. There is a fair demand for Steel Bands, which are held at 1.40c., base, extras as per Steel Card.

Tin Plate.—Conditions in the Tin Plate trade are very satisfactory, the mills having a large amount of business on their books for future deliveries. An interesting report is that the Continental Can Company is in the market for 50,000 boxes of Tin Plate for delivery over the first half of this year. Premiums of 10c. or more a box are being paid in some cases for small orders of Tin Plate for prompt delivery. We quote 100-lb. Cokes at $3.50 net, f.o.b. Pittsburgh, terms 30 days, or 2 per cent. off for cash in 10 days.

Merchant Pipe.—We note a continued active demand for Merchant Pipe, the leading mills having practically all the tonnage they can take care of for the next several months. Reports are that a gas line calling for about 130 miles of 16-inch Pipe has been placed with the leading interest. Prices are very firm, discounts to consumers in carloads being as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛ and ¼ inch	68½	52½	66½	50½
⅜ and ½ inch	72½	60½	70½	58½
¾ to 6 inches	76½	66½	75	65
7 to 12 inches	71½	56½	70	54½
Extra strong, plain ends.				
⅛ to ¾ inch	61½	49½	59½	47½
½ to 4 inches	68½	56½	66½	54½
4½ to 8 inches	64½	52½	62½	50½
Double extra strong, plain ends, ⅛ to 8 inches	57½	46½	55½	44½

Boiler Tubes.—The tonnage is quite satisfactory, demand for Tubes from the railroads being heavier than for some time, with indications that this class of consumers will buy more heavily this year than last. Prices are very firm, and we are advised are being strictly held. Discounts on carload lots are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ inches	45	48
1¾ to 2¼ inches	45	60
2½ inches	50	62
2¾ to 5 inches	57½	68
6 to 13 inches	45	60

Merchant Steel.—While there has been a lull in the demand for the past several weeks, specifications on con-

tracts are coming in very satisfactorily. We also note a heavy demand for Shafting, some of the leading producers being sold up for several months ahead. We quote: Tire Steel, 1.60c. to 1.65c.; Smooth Finished Machinery Steel, 1.60c.; Open Hearth Spring Steel, 2c. to 2.10c.; Toe Calk, 1.90c. to 2c.; Cold Rolled Shafting is 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—We note a very active demand, and several makers have recently advanced prices 5c. per 100 lbs. We quote Railroad Spikes at $1.65 to $1.70 in carloads per 100 lbs., and $1.75 in less than carloads.

Spelter.—We note a very active demand for Spelter and prices have again sharply advanced. To-day best grades of Prime Western Spelter are held firmly at 6.15c. St. Louis, equal to 6.27½c., Pittsburgh. The leading Spelter producers have their product well sold up for January and Ore is bringing $57 a ton. For these reasons still higher prices on Spelter seem likely.

Connellsville Coke.—Great activity prevails in the Coke trade, and this is shown by the fact that at the present time more ovens are in blast than ever before in the history of the Coke industry. The Frick Coke Company is operating every available oven that it can, this concern running at the present time a total of 15,896 ovens in the Upper and Lower Connellsville regions. In the Connellsville district proper there are 22,711 ovens, and of these 20,866 are active and only 1845 idle. In the Lower Connellsville region there are 6393 ovens, of which 5834 are active and only 559 are idle. The total output of the Upper and Lower Connellsville region last week was about 285,000 tons, a slight decrease over previous week on account of the New Year holiday. Coke for prompt shipment is very scarce, and dealers ask $2.75 to $3 a ton, at oven. It is claimed that spot Furnace Coke has sold at $3 a ton. Furnaces are pretty well covered by contracts, but it would be impossible to buy strictly Connellsville Furnace Coke at the present time under $2.50 a ton, at oven, even for shipment over first six months of this year. The best Connellsville 72-hour Foundry Coke readily brings $2.50 and up to $2.75 a ton, at oven.

New York.

NEW YORK, January 11, 1905.

Pig Iron.—A moderate amount of business has been done in this district in Foundry Irons, and some fair transactions have been put through in New England. The market is quite firm, quotations being as follows: Northern Irons, at tidewater, $17.75 to $18 for No. 1 X Foundry, $17.25 to $17.50 for No. 2 X Foundry and $16.75 to $17.25 for No. 2 Plain. Alabama and Tennessee Irons are quoted $17.50 to $17.75 for No. 1 Foundry and $17.25 to $17.50 for No. 2 Foundry.

Steel Rails.—The Eastern mills do not report any additional business. Up to January 1 the associated mills sold for delivery during 1905 an aggregate of 650,000 tons. We continue to quote $28 at mill, the practice of equalizing freight rates having been stopped this year. Light Rails are quiet and are quoted $23.50 to $25 at mill.

Cast Iron Pipe.—The local trade presents no special feature. Quite a number of inquiries are in the market, but buyers are not exhibiting much haste in placing orders. The Borough Construction Company is stated to have been the lowest bidder on the Brooklyn high pressure work, but the award of the contract has not yet been announced. Prices are very firm, and while carload lots are quoted at $26.50 to $27 per net ton for 6 to 8 inch at tidewater, it would probably be difficult to secure much Pipe at the inside rate.

Finished Iron and Steel.—It is understood that the agreement existing between the Iron League of this city and the manufacturers of Structural Material has been terminated. Under ordinary circumstances this would lead to lower prices on fabricated work, but as for some time very keen competition has been experienced in this line, it is believed to be unlikely that any worse condition of affairs will ensue. While considerable activity is shown in the erection of apartment houses and small buildings which take considerable quantities of steel, very little fitting is required in such cases. Large building operations, which would give business to fitting shops, are still exceedingly quiet. An important undertaking in this line which is expected to come on the carpet at a reasonably early day is the new Altman store on Fifth avenue, which it is estimated will require at least 10,000 tons. Bridge work has shown no movement of importance since the opening of the new year. Plans are being prepared, however, for the superstructure of the new Manhattan Bridge to be built over the East River, and it is expected that this work will be let in the spring, requiring fully 50,000 tons of Steel in various forms. The Plate and Bar trades are quiet, as is usual at this season. Prices are well maintained and quotations at tidewater are as follows: Beams, Channels, Angles and Zees, 1.64½c. to 1.80c.; Tees, 1.69½c. to 1.80c.; Bulbs, Angles and Deck Beams, 1.74½c. to 1.85c.; Sheared Plates in carload lots, 1.64½c. to 1.75c for Tank, 1.74½c. to 1.90c. for Flange, 1.84½c. to 2c. for Marine, 1.84½c. to 2.50c. for Fire Box, according to specification; refined Bar Iron, 1.64½c. to 1.69½c.; Soft Steel Bars, 1.54½c. to 1.64½c.

Old Material.—Inquiries continue for good quantities of Steel Scrap and other high class material. Foundries are purchasing Cast Scrap quite liberally. The rolling mills in eastern Pennsylvania have been large buyers of Busheling Scrap and in the last few days have taken at least 10,000 tons from dealers in this market. Stocks of this class of material are pretty well depleted, and some of the mills have found themselves compelled to do the best they could in supplying their needs. Quotations per gross ton, New York and vicinity, are approximately as follows:

Old Iron Rails	$21.00 to $22.00
Old Steel Rails, rerolling lengths	17.00 to 17.50
Old Steel Rails, short pieces	16.00 to 16.50
Relaying Rails	20.00 to 21.00
Old Car Wheels	16.00 to 16.50
Old Iron Car Axles	22.50 to 23.00
Old Steel Car Axles	20.00 to 20.50
Heavy Steel Scrap	16.00 to 16.50
No. 1 Railroad Wrought Scrap	20.00 to 21.00
No. 1 Yard Wrought Scrap	17.50 to 18.50
Iron Track Scrap	18.00 to 19.00
Wrought Pipe	15.00 to 15.50
Ordinary Light Iron	12.00 to 12.50
Cast Borings	10.00 to 10.50
Wrought Turnings	12.50 to 13.00
No. 1 Machinery Cast	15.00 to 16.00
Stove Plate	12.50 to 13.00

The United States Cast Iron Pipe & Foundry Company has moved its main offices from 80 Broadway to the twelfth floor of the Empire Building, 71 Broadway.

Metal Market.

NEW YORK, January 11, 1905.

Pig Tin.—The market has been very quiet and only a small amount of business was transacted. The spot quotation here remains unchanged, while a slight decline is to be recorded in the case of futures in this market and in both spot and futures in London. No interesting features developed during the week. At this writing spot is quoted here 29.05c. to 29.30c.; January, 28.90c. to 29.25c.; February, 28.60c. to 28.90c., and March, 28.60c. to 28.80c. Spot is quoted in London at £131 7s. 6d. and futures at £131. The arrivals thus far this month amount to 945 tons, while about 3290 tons are afloat. The annual statistics compiled by C. Mayer, secretary of the New York Metal Exchange, show the grand total of the supply of Tin for Europe and the United States for the year 1904 to be 92,400 tons, as compared with 89,000 tons for the year previous. The deliveries into consumption in Europe and the United States show a grand total of 91,606 tons, as compared with 91,266 tons for 1903. The grand total of stocks of Tins and quantities afloat for London, Holland and the United States at the close of the year foots up to 14,768 tons, as compared with 14,274 tons for the year 1903.

Copper.—The market is quiet and steady and devoid of interesting features. An attempt is being made to stiffen up the quotations on futures here, while in London the tendency has been toward lower prices right down the line. The principal producers are now quoting Lake, 15.12½c. to 15.37½c.; Electrolytic, 15c. to 15.25c., and Casting Copper, 14.75c. to 15c. The London market closed at £68 7s. 6d. for spot and £68 15s. for futures. Best Selected declined 5 shillings to £72 5s. The exports this month to date amount to 5088 tons.

Pig Lead.—A very moderate demand is noted in this market, but prices are firm and without change, owing to the limited shipments from the West. Spot Lead in New York is quoted at 4.60c. to 4.70c. The St. Louis market has declined a shade and is quoted to-day at 4.52½c. to 4.62½c., according to brand. The London market has declined slightly and was quoted to-day at £12 17s. 6d. The American Smelting & Refining Company still quotes on the basis of 4.60c. for "shipment" Desilverized in 50-ton lots.

Spelter.—The market is firm. Prices have advanced and an improvement in demand is to be noted. Spot Spelter was quoted to-day nominally at 6.15c. to 6.25c. The St. Louis market has advanced to 6.10c. London cables show a decline, quoting £25 2s. 6d.

Antimony—Is very weak and unchanged. Cookson's was quoted to-day at 9c. to 9.25c., Hallett's at 8.75c. to 9c., Japanese at 8c. to 8.25c. and other brands at 7.75c. to 8c.

Tin Plates.—The demand for Tin Plates continues very active, and at this writing the American Sheet & Tin Plate Company is operating fully 96 per cent. of its capacity. Very heavy contracts have been entered for delivery in the first and second quarters of this year, and it is said that some contracts have been accepted for delivery through the entire year. This business, with the orders coming in right along, insures the Tin Plate mills a very active season for some time to come. We understand that premiums of 5c. to 10c. a box are being paid for prompt shipment. The American Sheet & Tin Plate Company quotes on a basis of $3.74 per box for 14 x 20 100-lb. Coke Plates, f.o.b. New York, or $3.55, f.o.b. Pittsburgh. The Welsh market is unchanged.

The Machinery Trade.

NEW YORK, January 11, 1905.

With a continuance of the conditions which prevailed during the last week all doubts as to the accuracy of the predictions of several weeks past foretelling a resumption of real activity in machinery circles will soon be dispelled. It was a busy week. The mail was very much better than it has been for some time. Inquiries had a true ring and orders were not only considerably more numerous, but several good sized ones were placed. With the improvement in the tone of the market came a stiffening in prices. This movement has not spread over a very wide area of the market as yet, but there is a good deal of talk which points toward a strong probability of its being extended in the near future. The advances of the week included an improved style of a Cincinnati lathe which has met with a strong demand and certain sizes of milling machines. The increase in lathe prices amounts to 10 per cent., while in the case of the milling machines the advances range from 3½ to 5 per cent. The rumors of further probable advances referred to pertain to the popular sizes of standard lathes. The present scarcity of machines of this type seems to furnish a plausible excuse for such a move. The present barrenness of the market as regards these machines is, of course, directly attributable to the recent heavy buying on Japanese and Russian Government account. If it were possible to obtain details more might be said this week concerning such purchases, but it has been pretty well agreed all around that the wishes of the buyers should be respected in this connection and secrecy maintained as to details. The principal order we refer to was placed with a prominent Liberty street house and calls for about $75,000 worth of machine tools.

The demand for small amounts of machinery of practically all types has been excellent. The very large proportion of this comes from smaller sized concerns, as the larger manufacturers are considering the purchase of fairly good sized lots. Inquiries from the latter were numerous, many of them being the resurrection of propositions tabled last year and a number being entirely new. There are two or three entire new shop equipments precious near the closing point as a result of the week's work. On the whole it looks as though manufacturers have decided to proceed with some of their long mooted improvements and new projects.

The railroads took hold in earnest during the week under review, and as a result several good transactions in machine tools are to be recorded. In railway supplies trade was brisk and this condition also marked the general supply and specialties trade. Miscellaneous power transmission machinery was also in good demand incidental to the usual custom of many manufacturers to stock up with such materials at the beginning of the new year.

Builders of power generating machinery and accessories and their distributing agents have big things in prospect, but at the moment are not experiencing any great rush of orders. As in the other lines, some improvement was shown in this branch of the trade, but with the high speed engine and return tubular boiler people, for instance, business has been in a rather deplorable shape lately. The inactivity of the building trades, especially in the case of large office buildings, has naturally been in a large measure responsible for this. Although murmurings are to be heard which might seem to indicate labor troubles in the spring in the building trades, it is quite probable that lack of funds will prevent the unions from perpetrating any serious "hold ups." There is a great amount of projected construction work on paper in architects' and engineers' offices, and if next spring is attended with the good fortune of an absence of labor disturbances there will be a resumption which will prove most acceptable to the engine and boiler manufacturers. Builders of heavy engines, steam turbines and water tube boilers are as a rule well fixed for business and have a most excellent outlook before them. The gas engine trade is already showing signs of the healthy improvement promised for this year. The manufacture of suction gas producers is increasing rapidly. From all present indications the gas engine and suction producer are about to enjoy an era of popularity, for the inducement of "1 pound of coal per horse-power" is an especially tempting one to a prospective purchaser. It is said in the trade that at the recent meeting of the engine builders this subject was given much more attention and was viewed with greater apprehension by the high speed engine builders than was the steam turbine. Business in pumps and air compressors, which has been rather dull of late, is universally reported to be on the mend. Some fair sized orders were placed during the week, principally by the railroads.

A Prospective Consolidation.

For a number of weeks past there have been active negotiations in progress looking toward the consolidation of at least two of the principal builders of hoisting and conveying machinery. These overtures have, in fact, reached so acute a stage that it was expected that the combination would be effected by the first of this month. The desired result has not been attained as yet, although we understand that the negotiations have not yet ceased. Meetings have been held from time to time both here and in the Middle West, and the work has progressed to a stage where either the announcement of the consummation of or the abandonment of the project may be looked for at any time. Ore handling machinery is one of the main products of the two concerns involved in the affair.

The Retirement of Henry S. Manning.

Within a few days an announcement will be sent out into the trade by Manning, Maxwell & Moore to the effect that Henry S. Manning has sold his interest in the firm as well as in all of its allied manufacturing companies, to Charles A. Moore, who is now the sole owner of the entire business. In view of the importance of this firm in the machinery and railway supply trades this announcement is highly interesting. Papers were signed and the change became effective on Monday, the 9th inst. The firm name of Manning, Maxwell & Moore will be retained by Mr. Moore. The transaction was a most novel one, involving such great interests, and at the same time being carried out on a clean cut, old fashioned straight cash basis. Last Saturday Mr. Manning made known his intention to retire from active business, and extended to his partner the first opportunity to buy his holdings. The two men who had been yokefellows for quarter of a century got together and soon agreed upon terms. These were on a cash basis, Mr. Moore offering a lump sum of cash for all of Mr. Manning's holdings in all of the interests which they controlled between them. These included:

Manning, Maxwell & Moore, New York, Boston, Cleveland and Chicago.

The Ashcroft Mfg. Company, Bridgeport, Conn.

The Consolidated Safety Valve Company, Bridgeport, Conn.

The Hayden & Derby Mfg. Company, Boston.

The Hancock Inspirator Company, Boston.

The United Injector Company, Boston.

Owing to the excellent system under which the business has been operated a figure was quickly arrived at without the necessity of an inventory or any delay incidental to legal procedure. The firm of attorneys, Ely, Billings & Chester of 43 Cedar street, New York, which is to act as counsel to Mr. Moore as to his newly acquired interests, was called in and all was in readiness for the actual consummation of the transaction on Monday. The price agreed upon is naturally being kept secret, but that it was a good round sum may be judged from the fact that among the assets of Manning, Maxwell & Moore purchased by Mr. Moore was $200,000 cash to the firm's credit in banks. Nothing was done in the cases of the Shaw Electric Crane Company of Muskegon, Mich., and Pedrick & Ayer of Plainfield, N. J., as Mr. Manning had no interest in the former company, Mr. Moore already being the sole owner, and because he was the sole owner of the latter business and will retain it. The firm of Manning, Maxwell & Moore will, however, continue to act as selling agent for Pedrick & Ayer, for the time being at least. For the present Mr. Moore will only take his son Arthur into the business with him, but it is his intention to incorporate a company at a later date, in the formation of which the faithful labors of the older employees will receive recognition. Mr. Manning considers that the 30 years of work which he has devoted to the upbuilding of the business of Manning, Maxwell & Moore is sufficient justification for his retirement at this time. Besides, he is 60 years old and has important interests outside of Pedrick & Ayer, which include the International Banking Corporation, the Tennessee Coal & Iron Company and the Kansas City, Mexico & Orient Railway.

Mr. Moore came to New York to enter the firm of Henry S. Manning & Co., which was established May 1, 1873, about 25 years ago. On May 1, 1881, the firm of Manning, Maxwell & Moore was organized. About ten years ago Eugene L. Maxwell died and his interest was taken up by Messrs. Manning and Moore. The enormous growth of the business and its swift advance to the front rank of the machinery and railway supply trade is a story which need not be told to any one in the machinery business in this country. During recent years Mr. Moore's strong personality, energy and

enterprise have predominated in the doings of the firm, and his final succession to the entire business is a step which appeals as a most natural one to any one in the machinery trade.

Incorporation of the Cleveland Twist Drill Company.

In the year 1874 J. D. Cox in a very modest way established himself in Cleveland for the manufacturing of tools. Five years later F. F. Prentiss joined him as partner. For 25 years this partnership went on uninterruptedly and was known as "Cleveland Twist Drill Company." After 30 years of constant activity Mr. Cox has decided that he has earned a little rest and relief from responsibility, which was further emphasized by his health demanding a change, and with this in view the partnership was merged into a stock company and hereafter will be known as "The Cleveland Twist Drill Company." Before transferring the partnership affairs to the stock company several of the old employees were invited to take stock. This opportunity was readily accepted by all to whom the privilege was accorded. While Mr. Cox will be relieved of active duties, he will still retain his large holdings and also serve in the capacity of vice-president and director. The other officers of the company are: F. F. Prentiss, president and general manager; E. G. Buckwell, secretary; Geo. F. Kast, treasurer.

Large Machine Tool Orders.

The most important machine tool contract placed amounted to about $100,000. It was awarded to the Niles-Bement-Pond Company by the Bethlehem Steel Corporation. It called for a line of heavy tools to be intalled at the South Bethlehem plant.

The Philadeiphia & Reading Railroad, which has been in the market with a good sized list for several months, is now closing. We hear that about $75,000 worth of machine tools has been placed in Liberty street. The Chicago Pneumatic Tool Company received the air compressor order. The Chicago & Northwestern Railroad placed about $16,000 worth of machine tool business with the Niles-Bement-Pond Company, which also received a $25,000 order from the American Car & Foundry Company and a $20,000 contract from the New York Central & Hudson River Railroad.

The American Locomotive Company is scattering some fair sized machine tool orders, and the buying of the Pennsylvania Railroad has also been pretty active this week

It is expected that the big Lehigh Valley Railroad machine tool proposition will soon be closed.

The American Steel Foundries Company is extending its plant at Franklin, Pa., and has just purchased a 1000-foot air compressor from the Chicago Pneumatic Tool Company. The American Shipbuilding Company of Cleveland placed an order for a 1000-foot compressor, and the Louisville & Nashville Railroad bought a 500 and a 1500 foot machine from the Chicago company.

A good deal of interest is being taken in the trade in the official report that A. J. Cassatt, president of the Pennsylvania Railroad, is to enter the Board of Directors of the New York, New Haven & Hartford Railroad. About a week ago negotiations were completed for the transfer to the Pennsylvania Railroad of 10,000 shares of stock of the New York, New Haven & Hartford road, which, in addition to the holdings of this stock acquired by the Pennsylvania at various times within the last five years, is said to place the Pennsylvania Railroad among the few large stockholders of the New York, New Haven & Hartford property.

Owing to the general knowledge in the trade regarding the plans of the Sante Fé road in the way of machine shop facilities, &c., the announcement which was made last week to the effect that a special meeting of the stockholders of this road would be held January 24 for the purpose of voting on the proposition to increase the capital stock of the company by $50,000,000 and to issue bonds for that amount was received in the machinery trade with considerable interest. The call for the meeting announces that most of this money will be used in building new roads and improving the Sante Fé road in the Southwest.

In view of the interest which the machinery trade has taken in the New York $101,000,000 barge canal, it is interesting to note that the anticanal element is making things lively for the supporters of the scheme. Opinions have been written by eminent lawyers attacking the constitutionality of the law which sanctions the canal. Pending an investigation into this Governor Higgins is holding back the awards of all contracts. Meanwhile the bidders for the contracts which have been had are anxiously pressing their claims, having deposited certified checks for large sums.

Machinery for Erecting the Manhattan Bridge.

Plans for the new Manhattan Bridge are approaching the point when the machinery trade will receive orders for the machinery necessary for erecting the structure. Thus far the only important contracts closed are those for the anchorages in Brooklyn and Manhattan, which will be built respectively by the Kosmer Engineering Company, Brooklyn, N. Y., and the Williams Engineering & Construction Company, Park Row Building, New York. The contract price for the Brooklyn anchorage is $1,212,554, while that for the anchorage at the Manhattan end is $1,197,000. As yet neither of the companies has purchased any of the material for the work, and as it is expected that active operations will be started within the next two months it will be necessary for them to come in the market shortly for a large amount of material. Gustave Kaufman, 26 Court street, Brooklyn, engineer for the Kosmer Company, informs us that the equipment required by the company will include hoisting engines and other machinery besides a lot of miscellaneous material, details of which are not yet available. It is probable, however, that both concerns will purchase practically the same amount of mechanical apparatus. The Williams Engineering Company is now in the market for about eight hoisting engines, derricks, concrete mixer, buckets, sand, concrete, twisted steel rods for reinforcing the concrete, &c. The bridge engineers are now working on the plans for the superstructure, which will be of structural steel and wire cables, and it is expected that bids will be asked early in the spring. The general design of the bridge has been completed and accepted by the Art Commission.

Bids were asked on Monday for the new high pressure fire service mains which are to be laid throughout the downtown section of Brooklyn. Bids were also asked for furnishing 704 nozzle post hydrants and 42 nozzle fire boat connection hydrants. It will be recalled that the specifications for the gas engines were issued some time ago, but the purchases have not yet been made.

Announcement of Alfred H. Schütte.

On page 43 of our issue of September 15, 1904, reference was made to the division of Messrs. Schuchardt & Schütte of the large European machinery house of Schuchardt & Schütte. At that time Alfred H. Schütte announced that while he would operate the American end of his business under his own name, he would continue the old firm name in connection with his European offices. He now sends an announcement to the trade to the effect that the European houses will also carry the name of Alfred H. Schütte hereafter. The announcement is as follows: "Referring to the circular issued under date of September 1, 1904, with regard to the opening of a branch office under my name, Alfred H. Schütte, at 26 Cortlandt street, New York, I herewith beg leave to inform you that I now have decided to continue from and after this date under my name Alfred H. Schütte my showrooms and offices at Cologne, Germany, 24 Zeughausstrasse, as well as my branch houses at Brussels, Belgium, 5 V. Marché-aux-Grains; Liège, Belgium, 3 Rue de la Cathédrale; Paris, France, 85 bis Rue Réaumur; Milan, Italy, 52 Via Manzoni; Bilbao, Spain, 29 Gran Via, which so far I have carried on under the name of Schuchardt & Schütte.

"This alteration of the firm does not in any way affect my friendly relations and my contract of long duration with Messrs. Schuchardt & Schütte, Berlin, and their branch houses. According to this contract business on the European Continent has been divided between Mr. Schuchardt and myself ever since the beginning of 1902. My business will be conducted in future in the same manner as heretofore and with increased capital."

Power Plant Equipment and Miscellaneous Notes.

On the first of this month the Geo. F. Westcott Company, Buffalo, N. Y., which was recently incorporated, absorbed and took over the business of the power installation of that city and the engineering and construction business of Geo. F. Westcott. The new company will at once erect a large plant for the construction of elevating, hoisting, conveying and dredging machinery, labor saving appliances and everything requisite for power installations. The company's new plant will be located between the New York Central Railroad and the Erie Canal, at Ferry street, and the buildings for machine shops, &c., will be 100 x 220 feet, two stories in hight. A large storage yard at one end will be equipped with a 20-ton gantry electric traveling crane. Niagara Falls electric power will be used for operating the plant.

The Thompson-Starrett Company, 49 Wall street, New York, which has secured the contract for the construction of a great building for Sears, Roebuck & Co., Chicago, has not yet decided whether contracts for the power plant equipment and other mechanical apparatus will be placed from its office direct or at Chicago. Adams & Schwab, a large Chicago engineering firm, will serve in the capacity of consulting engineers and may have the awarding of contracts. The power plant will have a capacity of 5000 horse-power.

The Brown-Corliss Engine Company, Corliss, Wis., has just received an order from the Illinois Steel Company for a 2000 horse-power compound vertical and horizontal Corliss engine. This engine is similar in design to the large engine of its type exhibited at the St. Louis World's Fair, and it will be installed at the Joliet plant of the Illinois Steel Company.

An interesting announcement is made by the Western Iron Works, Incorporated, Los Angeles, Cal., which states that E. A. Guthrie, formerly with the American Steel & Wire Company of Pittsburgh and St. Louis, has purchased a large interest in this company and will be president and executive head. The company is at present making an

engine using as fuel gas, gasoline, distillate or crude oil, and furnishing a complete plant for irrigating purposes as well as power plants ranging in size from 50 to 100 horse-power. It is intended to increase the scope of this line considerably and extend the business very materially. It is intended also to more than double the present capacity of the plant, which is about 200 engines per year.

The firm of Edwin H. Ludeman & Co. of 39-41 Cortlandt street, New York, has succeeded Edwin H. Ludeman, and will continue the business and representations of the latter as heretofore. Edwin H. Ludeman and Oscar H. Ludeman are the principals of the new firm, which will represent in New York: Robert Wetherill & Co., builders of Corliss engines, Corliss pumping engines and air compressors; Berry safety boilers; the Williams engine; the Fitchburg Steam Engine Company four-valve automatic engines and vertical engines; Houston, Stanwood & Gamble Company, slide valve engines, and other firms building horizontal tubular and internally fired boilers.

The Morse Twist Drill & Machine Company, New Bedford, Mass., announces that it has placed with J. L. Osgood, Buffalo, N. Y., a full line of its manufactures.

The firm of Mordey & Dawbarn, 82 Victoria street, London, S. W., are receiving bids for 100 electric railway cars, two electric water motor cars, one 5-ton traveling crane, as well as an electric turntable and a fair sized lot of machine tools to be installed at Johannesburg, South Africa, by the Municipal Council of that city. The specifications are being forwarded by Mordey & Dawbarn upon receipt of 5 guineas, which will be returned upon receipt of the *bona fide* tender.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, is just completing additions to its plant which will more than double the capacity. This extension includes the installation of water wheels and other equipment as well as the erection of additional heating furnaces, &c. The company has just received an order from the Baldwin Locomotive Works, Philadelphia, for several thousand feet of double refined charcoal iron hollow bars, to be used in staying the fire boxes of a number of locomotives being built at the Baldwin Company's works for an important railway in Brazil.

The Essex Glue & Gelatine Company, 92 South street, Boston, Mass., is in the market for the complete equipment of all modern machinery adapted to the manufacture of glue, as it intends erecting an entire new plant. The officers of the company are: A. B. Clark, president; J. T. Lennox, vice-president, and A. B. Hoffman, treasurer.

Pattison Bros., consulting engineers, have specified that all the machinery in the power and lighting plant of the new Barclay Building, Broadway and Duane street, New York, shall be equipped with the Admiralty oiling system for engine oil and cylinder oil delivery. The J. H. Siegrist Company, New York, received the contract for the system.

Catalogues Wanted.—Irving McC. Bean, engineer and contractor, Scranton, Pa., is desirous of receiving catalogues from manufacturers of power plant machinery of all descriptions.

The Ecco Battery Company, San Francisco, Cal., is desirous of receiving catalogues from manufacturers of all types of machinery such as may be used in the manufacture of dry batteries.

The Shipbuilding Reorganization. — Formal announcement of the completion of the reorganization of the United States Shipbuilding Company will be made within a few days, when papers shall have passed and the entire properties been taken over by the Bethlehem Steel Corporation. As provided in the plan of reorganization the committee last Saturday incorporated the following subsidiary companies under the laws of the State of New Jersey: Union Iron Works, San Francisco, Cal.; Samuel L. Moore & Sons Corporation, Elizabethport, N. J.; Cartaret Improvement Company, Cartaret, N. J.; Crescent Shipyard Corporation, Elizabethport, N. J., and the Eastern Shipbuilding Corporation, New London, Conn. The capital stock of the Union Iron Works is placed at $2,000,000, and that of the other concerns at $300,000 each. This leaves the Bath Iron Works and Hyde Windlass Company, Bath, Maine, and the Harlan & Hollingsworth Company, Wilmington, Del., without new charters. The only reason given for not reincorporating the latter three companies is that it was not necessary. We understand that some of the plants are to be consolidated.

Orders have been issued by the Pennsylvania Railroad Company for 250 locomotives to be built at its Altoona shops. This is in addition to the order for 325 locomotives lately given to the Baldwin Locomotive Works. A large number of the locomotives will be of the heavy freight type.

Government Purchases.

WASHINGTON, D. C., January 11, 1905.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until January 24 for a quantity of supplies for the Portsmouth, Boston, Newport, New York, League Island, Annapolis, Washington, Norfolk, Key West and Pensacola navy yards, including a radial drill, milling machine, valve receding machine, drill press, core box machine, pumps, motors, &c.

Proposals will be received until January 28 by the Quartermaster, United States Army, at West Point, N. Y., for the installation of a boiler and mechanical draft plant at the military academy.

The following bids were opened last week for furnishing 20 6-inch disappearing gun carriages, model 1903:

Midvale Steel Company, $22,000 each; first in 280 days and one every 30 days thereafter.

Providence Engineering Works, Providence, R. I., for 10 carriages, $18,600 each; for 20 carriages, $16,950 each; first in 10 months, second in 12 months, third in 14 months, fourth in 16 months, fifth in 18 months, sixth in 19½ months, seventh in 21 months, eighth in 22½ months, ninth in 24 months, tenth in 25 months and one per month thereafter.

Detrick & Harvey Machine Company, Baltimore, Md., 10 carriages, $10,447; 20 carriages, $9898; first carriage in four and one-half months, second in five and one-half months and one every 20 days thereafter.

American & British Mfg. Company, Providence, R. I., for 10 carriages, $10,325; for 20 carriages, $9750; first in six months and one each month thereafter.

Morgan Engineering Company, Alliance, Ohio, for 20 carriages, $12,485; first in four months and one every month thereafter.

Wellman-Seaver-Morgan Company, Cleveland, Ohio, for 10 carriages, $11,930; for 20 carriages, $11,350; first in seven months, second in eight months, third in nine months and one every 20 working days thereafter.

Bethlehem Steel Company, South Bethlehem, Pa., 10 carriages, $12,125; 15 carriages, $10,160; 20 carriages, $9415; first carriage in 12 months, second in 15 months and one per month thereafter.

Alliance Machine Company, Alliance, Ohio, for 10 carriages, $13,200; for 20 carriages, $12,885; deliver one in eight months and one each six weeks thereafter.

The contract for the 40-ton crane for the Puget Sound Navy Yard, bids for which were opened December 31, has been awarded to the Cleveland Crane & Car Company, Wickliff, Ohio, at its bid of $6490. The other bids submitted were as follows:

Manning, Maxwell & Moore, New York, item 1, $8848; 2, $7884.

Pawling & Harnischfeger, Milwaukee, Wis., item 1, $7985.

Wellman-Seaver-Morgan Company, Cleveland, Ohio, item 1, $8365.

Whiting Foundry Equipment Company, Harvey, Ill., item 1, $7450.

Case Mfg. Company, Columbus, Ohio, item 1, $7100.

Niles-Bement-Pond Company, New York City, item 1, $6865.

Alliance Machine Company, Alliance, Ohio, item 1, $7762.

Morgan Engineering Company, Alliance, Ohio, item 2, $9100.

Under bids opened December 20 for supplies for the Mare Island and Puget Sound navy yards the Lima Locomotive & Machine Company, Lima, Ohio, was awarded class 2, one four-wheel coupled switching locomotive, $3795, and Wm. Sellers & Co., Philadelphia, Pa., class 4, one 4000-pound single frame steam hammer, $3420. No awards were made for class 1, one compressed air locomotive, air compressor and receiver; class 3, one 24-inch engine lathe and one 220-volt alternating motor.

The National-Acme Mfg. Company, Cleveland, Ohio, maker of the Acme multiple spindle automatic screw machine and manufacturer of set screws, cap screws, machine screws and special milled work turned from steel, iron, zinc and brass, announces that its Western office, of which A. B. Breeze is manager, has been removed from 166 Lake street to 63 South Canal street, Chicago, Ill., more commodious quarters being required to take care of the increasing trade in that territory. The company has also increased its working force, placing J. T. Donahue in that territory as assistant to Mr. Breeze.

Allan F. McIntyre, iron, steel, railway supplies, &c., 710 Fisher Building, Chicago, has been appointed Western manager for the Abendroth & Root Mfg. Company, manufacturers of spiral riveted pipe, water tube boilers, &c.

Chicago Machinery Market.

CHICAGO, ILL., January 7, 1905.

Every dealer in machinery and tools reports a phenomenal increase in inquiry and in actual business. The same is true of manufacturers and their representatives. It seems certain that the year 1905 will be a very heavy one in machinery and tools, fully compensating for the slackness of trade in 1904. The demand at the present time is due both to delayed orders which have been placed during 1904 and to the development of new manufacturing propositions. Already one begins to hear of shortages in certain lines, notwithstanding the fact that makers and sellers alike had unwillingly accumulated stocks during the greater part of 1904.

Large Machinery Requirements of Locomotive Works.

The South Side Elevated Railway Company, Chicago, expects to issue in the course of a month or so specifications for an entirely new power plant, which will probably be about the size of the present plant at Fortieth and State streets. While information relative to the location of the plant and its power equipment is not yet forthcoming, one of the officials of the company estimates the capacity of boilers to be purchased at about 6000 horse-power, with engines, generators and other required machinery in proportion. Sargent & Lundy are engineers in charge of the work.

Equipment for the new plant of the Cable-Nelson Piano Company of Chicago at South Haven, Mich., was placed as a whole with the Whitehead Machinery Company, Davenport, Iowa. This equipment includes three Frost 16 foot by 66 inch tubular boilers, one 40 and one 20 kw. Westinghouse generator, one 257 horse-power Hamilton Corliss engine, one 75 horse-power Bach automatic engine, two Fairbanks-Morse feed pumps and one Fairbanks-Morse underwriters' fire pump, two elevators operated by two 15 horse-power motors built by the Moline Elevator Company. This plant consists of a main building, 60 x 300 feet, and two wings, each 60 x 150 feet.

L. Kiper & Sons, manufacturers of saddlery, are erecting an eight-story addition to their factory, 45 x 118 feet. The steel work for this structure was let to the Butler Street Foundry Iron Works, Chicago; the boilers, two in number, each 72 inches by 18 feet, to the Erie Boiler Company, Erie, Pa., and one 120-kw. generators to the General Electric Company. C. A. Eckstorm, Tacoma Building, is the architect.

The Illinois Tunnel Company has bought dock property at Taylor and Beach streets, Chicago, 404 x 700 feet, and will erect thereon a suitable freight terminal for its underground transportation line. The property is now occupied by warehouses ranging from six to ten stories in hight, leased by Albert Dickinson & Co., the seed merchants, and portions of present structures will be utilized by the Tunnel Company in the erection of its terminal. A large amount of building material besides a power plant and accessory machinery will be required.

Activity on State Street.

The most noteworthy scene of activity in building during the coming year will be along State street, the great retail dry goods thoroughfare. Marshall Field & Co. propose the erection of an addition to their present building, which will give them all of the block except that occupied by the Trude Building, on the corner of Randolph street and Wabash avenue, and may in time embrace that building as well. The new structure will conform with the new sections of their store at the north end of the State street frontage. This building will require 6000 to 8000 tons of steel and will undoubtedly necessitate an increase in the machinery equipment as well. D. H. Burnham & Co. are the architects.

Mandel Brothers, who occupy large premises just a block south of the Marshall Field store, are planning the erection of an entirely new building on the Wabash avenue frontage, and active work will be begun this month. This building will call for several thousand tons of structural steel. The original proposition made some months ago to enlarge and modernize the firm's present power plant has been temporarily shelved. Holabird & Roche are the architects.

Joseph Leiter, owner of the premises leased by Hillmans, will tear down the building lying between the Reliance and the new Hillman structure and will replace it with a building conforming to the size and architecture of the Hillman building at a cost of $250,000. The old boilers, engines and other machinery will be replaced with modern equipment.

Just south of this in the same block is the new Boston store project. This will involve the expenditure of at least $5,000,000 and the purchase and erection of about 10,000 tons of structural steel, together with power equipment which will be based on about eight 300 horse-power boilers, three 300 horse-power engines and three 200-kw. generators. This store will occupy half a block.

Immediately south of the Boston store is the new Chicago Savings Bank building, reference to which has been made in previous issues of *The Iron Age*, and adjoining this to the south at 138-144 State street is to be erected a 14-story store building by Stumer, Rosenthal & Eckstein. Holabird & Roche are architects.

On the corner of Adams and State streets, where the Fair now conducts a large retail department store, occupying one-half block in dimensions, it is understood that the power plant will have to be increased in proportion to the added floor space, due to the addition of at least two stories on top of the present structure. Details have not yet been announced, but it is believed that bids will be asked for in the near future on about 2000 horse-power in boilers, 1800 horse-power in engines and 1200 horse-power in generators, together with subsidiary equipments. Jenney & Mundie are the architects.

On the corner of Jackson and State streets another 12-story building is proposed by Stumer, Rosenthal & Eckstein, active work on which cannot be commenced until the lease on the present building expires next May. Holabird & Roche are the architects.

Taken altogether the improvements on State street proposed for 1905 will aggregate not less than $25,000,000 and may run up to $50,000,000.

Other Building News.

Marshall Field & Co. are constructing a huge 14-story warehouse at Polk street and the Chicago River, the structural steel for which aggregated 5000 tons. The purchase of machinery and equipment of this warehouse is in the hands of D. H. Burnham & Co., architects.

The same architects also have in hand drawings for a new Field museum to be built on the lake front, into which will be moved, when it is completed, the old Columbian Field Museum at the World's Fair grounds. It is too early to estimate the steel or the machinery required for this building.

These architects are also preparing foundations for the Memphis Trust Company's building at Memphis, Tenn., a modern steel structure costing about $1,000,000; also for the Fourth National Bank at Cincinnati, which will cost perhaps $500,000. Most of the contracts have been let on the Memphis and Cincinnati buildings.

Sargent & Lundy, Railway Exchange Building, Chicago, are completing plans for a large electric light and power station at Waukegan for the North Shore Electric Company, which supplies electric light and power to cities and villages between Chicago and Milwaukee.

T. T. Johnson, 188 Madison street, is engineer for a proposed electric light and water power plant to be erected at Marseilles, Ill. Preliminary plans call for the purchase and installation of four 750-kw. generators and six 68-inch water wheels, but nothing has been definitely settled as yet.

The American-Mexican Smelting Company, Chicago, contemplates the expenditure of possibly $50,000 or $60,000 in the improvement of its various plants in Mexico, but plans may not take form before May. Geo. P. Penwell, 84 Adams street, is a director of the company.

The Western Felt Works, now located at Canal and Lumber streets, on leased property, will erect a plant of its own. A main building will be erected, 100 x 200 feet, with two wings, one of which will be 58 x 60 feet and the other 38 x 40 feet, and a boiler house, 27 x 68 feet. A 150 horse-power Cahall boiler and a 16 x 42 Hamilton Corliss engine have been purchased, the balance of the machinery being removed from the old plant.

Electric power for the new Northern Trust Company Bank building, which will be erected at Monroe and La Salle streets, Chicago, will be supplied by the Edison Company.

Teich & Roessler, proprietors of the Kaiserhof Hotel, South Clark street, Chicago, have leased for 80 years 50 x 113 feet of land adjoining them on the north and will erect thereon a modern hotel and convention hall to cost over $100,000. The architect is not yet announced.

The Illinois Athletic Club has acquired a 99-year lease on property at 145, 146 and 147 Michigan avenue, Chicago, and will erect thereon a steel frame club house to cost $500,000. The building will include a power, heating and lighting plant, swimming bath, gymnasium, audience hall and other adjuncts to a modern city club house. Barnett, Haines & Barnett, St. Louis, are the architects, and Purdy & Hanson, Monadnock Block, Chicago, the mechanical engineers. Work will commence at once.

The S. H. Supply Company of Denver, Col., will consolidate all of their present stores now located at Twenty-second and Larimer streets into one, which will occupy the mammoth building at Eighteenth and Lawrence streets, formerly used as the central power station of the Denver City Tramway Company of that city. This building fronts for 200 feet on Lawrence street, and extends for 125 feet on Eighteenth street, is two stories high, with basement extending under both Lawrence and Eighteenth streets. The display of machinery in this building will cover every known machine used in mining and milling and their complete stock of supplies, which is one of the largest in the West. It will also include a complete stock of electrical, assay and plumbing goods.

Trade Publications.

Steel Shafting, Pulleys, &c.—Jones & Laughlin Steel Company, Pittsburgh, Pa. Price-list of patent cold rolled steel shafting, couplings, bearings, pulleys, rope sheaves, mule pulley stands, belt tighteners, binder frames, guide pulleys, friction clutch couplings and pulleys, &c. Pages, 208, 4½ x 7 inches. Contains an extract from a report on "The Testing of Cold Rolled Steel," made by the late Prof. Robert H. Thurston, Cornell University. Profusely illustrated with both half-tones and line drawings.

Kerosene Engines.—The International Power Vehicle Company, Stamford, Conn. Illustrated catalogue. Contains a description of the construction of the International kerosene oil engines, which are made in sizes of from 1¼ to 10 horse-power. Also describes reversing clutches for launches, these being made in sizes of from 4 to 20 horse-power. Other applications of the engines are shown.

Retarding Conveyors.—The Interstate Engineering Company, Bedford, Ohio. Pamphlet No. 100. Illustrates two retarding conveyors installed at War Eagle, W. Va., for handling coal from the same vein on opposite sides of the valley. A testimonial letter gives the manager's opinion of the installation.

Trolley Tracking.—The Coburn Trolley Track Mfg. Company, Holyoke, Mass. Pamphlet. Illustrates the use of Coburn tracking in a foundry and other works. An inclosed circular shows an electrically equipped carrier and hoist for operating an overhead track, this being made in capacities up to 5 tons.

Core Machinery.—The Falls Rivet & Machine Company, Cuyahoga Falls, Ohio. Catalogue. Pages, 16, 6 x 9 inches. Descriptive of Wadsworth core machines. These are manufactured in 24 sizes to make cores from ⅜ to 6 inches in diameter, round, square, hexagon or D shapes. Capacity, 200 to 600 feet of core in one hour.

Hoisting and Conveying Machinery.—The McMyler Mfg. Company, Cleveland, Ohio. Catalogue. Pages 74, 6 x 9 inches. Illustrated. Contains descriptions and views of steam revolving locomotive cranes, slag handling machines, gantry cranes and coal handling machines for railroads, unloading towers, conveyors, fuel handling machines, hoisting engines, car dumping machines and buckets.

Warming and Ventilating Equipment.—Sturtevant Engineering Company, Limited, 147 Queen Victoria street, London, England. Mailing card. Concerns the Sturtevant system of warming and ventilating modern engineering works and gives illustration of typical modern foundry equipped with this system. Also gives a list of Sturtevant catalogues.

Pneumatic Tools and Riveters.—American Air Tool Company, Dunkirk, N. Y. Two circulars. The first gives illustrations and specifications of pneumatic and hand chisels; the second, illustration and description of the American compression riveter, made in four sizes with capacities for rivets from ½ to 1⅛ inches.

Variable Speed Motor Drive.—Northern Electrical Mfg. Company, Madison, Wis. Bulletin No. 37. Illustrations show applications of variable speed motors supplied on single voltage systems, driving boring mill, lathes, shaper, milling machines, planer and radial drill.

Electrical Machinery.—Fort Wayne Electric Works, Fort Wayne, Ind. Two bulletins and flyer. Bulletin 1058 illustrates and describes multiphase revolving field generators, engine driven; also type A rheostats for use with the generator. Bulletin 1059 illustrates three types of commutator truing devices and their application. Flyer 4050 concerns a porcelain primary fuse box, type E P.

Spiral Riveted Pipe.—American Spiral Pipe Works, 1173 South Paulina street, Chicago, Ill. Circular. Gives numerous illustrations of Taylor's spiral riveted pipe as used for submerged water mains, exhaust steam pipes, &c. Mentions that the cascades and fountains of the Louisiana Purchase Exposition at St. Louis were supplied through Taylor's spiral riveted pipe.

Industrial Railway.—Arthur Koppell, 66 Broad street, New York City. Pamphlet entitled "On the Track." Contains a reprint from *Cassier's Magazine* by Ernest Weiner and several illustrations, including steel rails, steel ties, industrial and portable track, turnout, turntables, wheels and axles, axle boxes, roller bearings, small platform cars, steel and wooden dump cars, mine cars, skips, ladle cars, &c.

Blue Printing Machines.—Spaulding Print Paper Company, Incorporated, 44 Federal street, Boston, Mass. Pamphlet. Gives illustrations and descriptions of Federal blueprinting machines and apparatus for the continuous making of blue prints by electric light.

Valves and Condensers.—Schutte & Koerting, Philadelphia, Pa. Two circulars. The first is descriptive of the Schutte valve, contrasting it with the ordinary globe valve. It also shows balanced screw spindle, throttle valve and balanced lever valve, stop check valve, automatic free exhaust valve and back pressure valve. The second concerns the Schutte & Koerting eductor condenser.

Engines and Boilers.—Sherwood Mfg. Company, 1702 Elmwood avenue, Buffalo, N. Y. Announcement of the occupancy of its new factory. Also calls attention to the line of goods manufactured, including injectors, boiler tube cleaners, oil cups, lubricators, oil pumps, &c.

Sheet Steel Piling.—United States Steel Piling Company, 135 Adams street, Chicago, Ill. Circular. Illustrated. Shows the form of the sheet steel piling and various ways of assembling.

Marine Engines.—J. Kowalsky Engine Company, Verona, Pa. Catalogue and circular. Catalogue gives illustrations and descriptions of launches and engines, the latter being 2½ horse-power. The construction is taken up in detail. The circular shows the Kowalsky automobile engine and gives specifications of its dimensions.

Tubing and Electric Welding.—The Standard Welding Company, Cleveland, Ohio. Pamphlet. Shows a part of the extensive line which this company manufactures and its capabilities in electric welding. Divided into three sections: A, tubing, giving price-list, &c.: B, seamless steel rims, and C, bicycle parts and miscellaneous welding.

Gas Engines.—Fort Wayne Foundry & Machine Company, Fort Wayne, Ind. Illustrated catalogue. Contains a general description of the Wayne engine and its parts and draws attention to advantages in its operation. The various illustrations show the engine alone and in combination with hoists, pumps, electric generators, &c. Portable rigs on wheels are also shown.

Sulphate of Iron.—American Steel & Wire Company, Chicago, New York, &c. Pamphlet dealing with the usefulness of sulphate of iron or copperas. Its applications include water, sewage and gas purification, disinfecting and deodorizing, polishing, preserving wood, fertilizing, silk and wool dyeing, leather tanning, &c.

Hydraulic Pit Jacks.—Watson-Stillman Company, 46 Dey street, New York. Catalogue No. 66. Describes the Vreeland patent transfer pit jack and hydro-pneumatic pit jacks. The air power is used for accelerating the work under low pressure. Drawings show the manner of installing and using pit jacks. Motor lift jacks and electric battery lifts for street railways are also described.

Calendars.

The Republic Iron & Steel Company, Chicago, Ill. Desk memorandum pad calendar.

Jos. F. Wangler Boiler & Sheet Iron Works Company, 1535 North Ninth street, St. Louis, Mo. Hanger monthly calendar.

H. B. Underwood & Co., 1025 Hamilton street, Philadelphia, Pa. Hanger monthly calendar.

Manville Bros. Company, Waterbury, Conn. 19½ x 27½ inch pictorial panel, with small monthly calendar on the bottom.

The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Leather bound diary; also containing electrical and mechanical engineering data and general useful information.

The McCullough-Dalzell Crucible Company, Pittsburgh, Pa. Hanger monthly calendar, with a view of the works.

The Holzer-Cabot Electric Company, Boston (Brookline), Mass. A three-piece hanger monthly calendar, showing half-tones of apparatus manufactured and views of the works.

The Joliet Bridge & Iron Company, Joliet, Ill. Hanger monthly calendar, 14 x 22 inches. Large half-tone view of five-span bridge across Kankakee River between Will and Grundy counties, Illinois.

The Enterprise Boiler Company, Youngstown, Ohio. Monthly calendar mounted on 13 x 16 inch card, with center feature a relief bust entitled "Meditation."

Climax Road Machine Company, Marathon, Ohio. Panel calendar, 6¼ x 13½ inches, with *fac-simile* of burnt wood sketch, "The River Road," printed on thin wood veneer backed with heavy cardboard.

Steam Stone Cutter Company, Rutland, Vt. Hanger calendar, 19 x 24 inches. Views of double gang sandstone machine, double gang electric channeling machine and double gang marble and limestone machine.

Ernest Law & Co., Harrison Building, Fifteenth and Market streets, Philadelphia, Pa. Hanger monthly calendar, 11 x 14 inches. Large, legible figures.

The Washington Coal & Coke Company, Pittsburgh, Pa. Handsome leather bound diary containing a large amount of useful information.

The Kutztown Foundry & Machine Company, Incorporated, Fidelity Building, Philadelphia, Pa. Monthly calendar mounted on black card 16 x 20 inches, with central feature a relief plaque of Ceres, the goddess of harvest.

The Pittsburgh Manufacturers' Association.—The sixth annual dinner of this organization was held in the Duquesne Club on the evening of January 10 and was attended by about 150 representatives of the leading founudries, machine shops and other manufacturing plants in the district. A number of invited guests were also present. Edward Kneeland, treasurer of the United Engineering & Foundry Company, was toast master. A number of very interesting addresses were made, one by Isaac W. Frank, president of the United Engineering & Foundry Company, on the labor bureau of the association. Mr. Frank pointed out in his address very strongly the benefits to be derived by the members in patronizing the bureau, and urged that they take advantage of it. There were musical and other features in the entertainment provided at the dinner, and it was a very pleasant occasion. The membership of the association is steadily increasing, the organization having proved very beneficial.

The New York Pig Iron Warrant Market.

Considerable improvement marked the demand for pig iron storage warrant certificates on the New York Produce Exchange the past week, the sales totaling up to about 1200 tons, quite an increase over those of the two previous weeks. Of the transactions more than half were made for May and June deliveries. January delivery, 200 tons were sold at $16.90; February, 200 tons, $17.20, and 100 tons, $17.10; May, 400 tons, $17; June, 100 tons, $17.25; 100 tons, $17.05, and 100 tons, $17. As the trading has been almost exclusively confined to futures very little iron has thus far been taken up, but it is expected that several thousand tons, principally Bessemer Iron, will be taken out of the storage yards this month, and as the actual iron begins to move more freely it is thought that greater activity will prevail in the warrant certificate market. The following are the quotations established on call Wednesday noon:

	Bid.	Asked.
Cash	$16.50	....
January	16.90	$17.10
February	16.90	17.05
March	17.00	17.10
April	17.00	....
May	17.00	17.30
June	16.75	17.25
July	16.50	17.00
August	....	17.00
September	....	17.00

Iron and Industrial Stocks.

NEW YORK, January 11, 1905.

The event of the week has been the placing of the preferred stock of the United States Cast Iron Pipe & Foundry Company on a 7 per cent. basis, which was done at a meeting of the directors held in this city yesterday. The increase in the dividend rate was foreshadowed by an advance in both the preferred and common stock. The preferred, which was quoted at a minimum of 81 last Thursday, touched 86⅜ on Tuesday of this week, from which a recession occurred under profit taking to 84¼. The common advanced from 22⅜ to 24⅝. Crucible Steel preferred advanced at Pittsburgh from 58½ to 61. Other stocks showed strength during the week, but with transactions running considerably under the average of recent weeks. The most important recession in any stock was in Republic preferred, which declined from 70¾ on Thursday of last week to 67½ on Monday of this week. Last transactions on active stocks up to 1.30 p.m. to-day are reported at the following prices: Can common 11¾, preferred 62¾; Car & Foundry common 34⅛, preferred 93; Locomotive common 35, preferred 104½; Colorado Fuel 46¼; Pressed Steel common 37⅞, preferred 90; Railway Spring common 33⅛, preferred 94; Republic common 16⅛, preferred 68½; Sloss-Sheffield common 62⅞, preferred 102; Tennessee Coal 71¼; United States Cast Iron Pipe common 24⅝, preferred 85¾; United States Steel common 29¼, preferred 92½, new 5's 92¾.

During the first week of January a large number of industrial concerns in the Pittsburgh district paid quarterly payments on their securities, this resulting in a distribution of a very large amount of money. Among concerns that paid dividends on their securities and the amounts were the following:

Allegheny Steel & Iron Company	$8,000
Bessemer Coke Company	12,750
Harbison-Walker Refractories Company	96,000
Magnus Metal Company	20,000
Monongahela Coal & Coke Company	350,000
National Fire Proofing Company	140,000
Ohio Fuel Supply Company	100,000
Pittsburgh Oil & Gas Company	120,000
People's Natural Gas & Pipeage Company	12,000
Pittsburgh Plate Glass Company	185,250
Philadelphia Company	435,000
Pittsburgh Gage & Supply Company	2,691
Pittsburgh Lamp, Brass & Glass Company	26,250
Penn-American Plate Glass Company	26,230
Pittsburgh Coal Company	542,500
Standard Underground Cable Company	80,000
Union Switch & Signal Company	30,000
Union Natural Gas Company	180,000
United States Glass Company	32,000
Union Storage Company	14,000
Westinghouse Air Brake Company	550,000
Westinghouse Electric & Mfg. Company, firsts	89,968
Westinghouse Electric & Mfg. Company, seconds	462,250
Westinghouse Machine Company	125,000

The American Car & Foundry Company's net earnings for the quarter ending November 30 were $539,693, which a little more than covers the usual quarterly dividend on the preferred stock, $525,000. In the corresponding quarter of 1903 the company's net earnings were $1,561,485, not far from three times what they were during the last completed quarter. The decrease is $1,021,791 as compared with the earnings of the November quarter of 1903 and $1,612,551 as compared with the same period of 1902. The company's net earnings were so much less than had been expected in financial and trade circles that they attracted considerable attention. An officer of the company stated that it had experienced a satisfactory business during the November quarter in regard to the volume of orders received, but that this improvement had not been reflected in the figures for that quarter.

Dividends.—American Car & Foundry Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable February 1.

Rogers Locomotive Works has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, and a quarterly dividend of 1½ per cent. on the common stock, both payable February 1.

United States Cast Iron Pipe & Foundry Company has declared a quarterly dividend of 1¾ per cent. on the preferred stock, an increase of 1 per cent. over the previous payment. This places the stock on a 7 per cent. annual basis. The dividend is payable March 1.

The Harbison-Walker Refractories Company, Pittsburgh, has declared a dividend of 1 per cent. on the preferred stock, payable January 20.

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HARDWARE.

WHETHER or not their full significance is recognized, the trade are familiar in a general way with the changes which are taking place in the distribution of merchandise as old channels are being superseded or, at least, supplemented by new ones, short cuts between manufacturer and consumer being made use of, and in one way or another the regular time honored movement of goods through several hands is abandoned. In this connection our readers will naturally think of the manner in which the retailer is frequently circumvented by the jobber or manufacturer who goes direct to his customer, the disturbing methods of the catalogue house, the extent to which retail houses are coming into relations with manufacturers, as well as the less developed tendencies toward the uniting of smaller merchants in the purchase of goods and the somewhat remarkable increase in mail order business between jobbers or manufacturers and the trade. These and similar modifications of former methods, notwithstanding the fact that they are deplored by many, probably mark a permanent drift in the direction of new channels, and it may be hoped, despite the fact that they are inconvenient to certain vested interests and to those who find it hard to adapt themselves to new conditions, that they are in the line of progress and will ultimately justify themselves. Whatever opinion may be entertained, however, in regard to the desirableness of these changes, there is an obvious obligation on individuals in the trade to be prompt to recognize the drift of things and to take advantage of any opportunities presented by the spirit or tendencies of the times, whether they are temporary or permanent. The ability to see things as they are and to judge correctly how they are going is part of the endowment of the successful man of business, provided it is coupled with the ability to modify methods in accordance with the changing conditions of business. Those who are able to do this will be keeping step with the progress of things, while those who are too firmly attached by choice or by habit to methods or policies which have become outgrown and antiquated will have to suffer the consequences. The procession will continue to move.

Besides these well-known tendencies toward new methods in the distribution of goods there are indications of changes in connection with the manufacture of goods which may perhaps be significant of developments which will have important influences on trade in several ways. The attention of our readers has been repeatedly called to the fact that the catalogue houses are becoming manufacturers of certain leading lines, or are closely allying themselves with manufacturers so as to make them to some extent independent of the regular sources of supply. Such action obviously affects both manufacturing and distributing interests, as new competition thus enters the market so far as the production of goods is concerned, while at the same time these houses are getting a stronger position as distributers, as they are rendered less accessible to the attacks made upon them by organizations of merchants and are enabled, if their manufacturing is conducted successfully, to realize profits both as producers and distributers. Something of the same kind is to be noted in the enterprise of the jobbing trade. It is well known that some prominent jobbing houses have for years been closely identified with manufacturing plants by actual ownership or important financial support given them, or in view of the fact that they take substantially their entire output. This tendency finds an impressive illustration in the recent acquirement of a Horseshoe plant by certain associated jobbing houses in the line of Heavy Hardware, a development which illustrates not only the entrance of jobbers into the manufacturing field, but the uniting of their interests whereby joint action in manufacturing enterprise is secured. Some interesting questions are brought up in connection with such developments, especially in cases where jobbers owning a plant are parties to a combination with other manufacturers as to production and prices. If the catalogue houses in self defense are ready to become manufacturers of the goods they handle the trade must not be surprised if the jobbers in order to hold their trade and to defend themselves against the loss of their business are equally prompt in availing themselves of what is in some respects a radical departure from former conditions. How far they can do this advantageously is a question which will determine the extent to which progress in this direction is to be expected.

Condition of Trade.

The early days of January are in most establishments given largely to matters connected with the general conduct of business rather than to active efforts in buying and selling goods. At this season many things force themselves upon the attention of merchants and manufacturers, such as the taking of the annual inventory, a careful review of the situation and endeavor to correct the mistakes of the past and get everything into running order, with the making of plans for the future. There are few concerns managed with energy and enterprise in which matters of this character do not require careful consideration and make their demands for wise and efficient action. Under these influences trade during the first week or two of the year is usually rather quiet, with a cessation of active solicitation of orders on the part of manufacturers, and with the merchants generally in a waiting attitude. This is the case this year, as there is something of a lull in purchasing. This, however, does not involve anything of lack of confidence in the market or in the volume of business which is expected during the season. The trade generally have been somewhat surprised by the comparatively few changes in list prices or in quotations which have taken place, most of the revisions being of minor importance. The changes in price which have occurred are nearly all in the direction of higher values. At this writing the trade is beginning to assume a more aggressive tone, as travelers are going out and merchants, having completed their stocktaking, are preparing for replenishing it so as to be in good condition for business as it comes.

Chicago

The trade is still characterized by an unusual activity in far future business. For instance, orders are beginning to come in in unusual volume for Hods, Elbows and other strictly winter goods for delivery next fall. An unusual tonnage of orders is being booked for summer goods, particularly Lawn Mowers, the demand for summer and fall goods being, without any doubt, stimulated by the feeling that prices will go higher and higher as the season advances. Axes have been advanced for the purpose of strengthening the hands of the jobbers in the disposition of stocks left on hand, as the season has practically closed, and it is not unlikely that under normal conditions prices will be reduced again later in the year. Stove Pipe Dampers have been advanced about 10 per cent. Prices in Wire Nails and Wire are now at a point where in terms of the

cost of Rods and Billets independent makers of Wire products say they can barely come out even. As a consequence price cutting is eliminated, and the 5 cents differential between jobbers' and retailers' car lot prices is, as far as can be learned, strictly maintained by independents as well as by the leading producer. Some independents have reached a point where they have practically withdrawn from the market by advancing prices above those of the leading producer.

NOTES ON PRICES.

Wire Nails.—Buyers have anticipated their wants on account of possible higher prices, so that business which under ordinary conditions would be placed at this season is already on the books of mills. The market is firm, high prices of raw material eliminating any temptation to the mills not controlling their supplies to cut prices. Specifications on contracts are coming in freely. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days.

Carload lots to jobbers	$1.75
Carload lots to retailers	1.80

New York.—Business is moderate in the local market, though there is a steady demand. The market is firm at the following quotations: Single carloads, $1.94½; small lots from store, $2.

Chicago.—New business is light, but specifications on contracts are excellent. Prices are held firmly at $1.90, base, in carlots to jobbers and $1.95 to retailers, with 5 cents extra for less than car lots from mill.

Pittsburgh.—There is nothing of special interest to note in the Wire Nail trade, demand having shown something of a lull since the first of the year. However, the mills are still employed on old contracts, specifications for which are coming in very freely. The heavy snow of the past week has interfered materially with shipments from the mills, which is causing no little inconvenience in the trade. The market is very firm, but as yet there is no announcement from the leading interest of an advance in prices. We quote Wire Nails in carloads to jobbers at $1.75 and in less than carloads at $1.80, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days.

Cut Nails.—The meeting of the Cut Nail Association is scheduled for the 25th inst. Should a change in the price of Wire Nails take place previously the price of Cut Nails would advance to the same figure without formal action. New business has only been fair since the first of the year, but mills are engaged in filling specifications on contract orders. The market remains firm. Quotations are as follows: Carload lots, $1.75; less than carload lots to jobbers, $1.80, and to retailers, $1.90, f.o.b. Pittsburgh. Iron Cut Nails, for delivery at Pittsburgh, Buffalo and all points west of these cities, 10 cents advance per keg on Steel Nails.

New York.—There is a steady but light demand, while the market remains firm. New York quotations are as follows: Carloads on dock, $1.89; less than carloads on dock, $1.94; small lots from store, $2.

Chicago.—Mills are still very generally holding up prices to the Wire Nail basis and getting only a fair business, as at even figures, except in shingling and flooring sizes, most buyers prefer Wire. Demand for Pure Puddled Iron Roofing Nails at a 10-cent premium is still in evidence. Association prices on Steel and Scrap Iron Cut Nails are unchanged as follows: $1.90 for car lots to jobbers, $1.95 in car lots to retailers, with 5 to 10 cents advance for less than car lots from mill, according to character and size of order.

Pittsburgh.—Demand for Cut Nails so far this year has only been fair, but the market is firm. The mills are well filled with contracts, on which buyers are specifying quite freely. Should the price of Wire Nails be advanced a similar advance in Cut Nails will immediately follow. The market is firm and we quote: Carloads, $1.75, base; less than carloads to jobbers, $1.80, base; less than carloads to retailers, $1.90, base, plus carload rate of freight to point of delivery; terms 60 days, less 2 per cent. off for cash in 10 days. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities are 10 cents a keg higher than above prices.

Barb Wire.—The market is characterized by a firm tone and mills are fully engaged in filling specifications on contracts and taking care of current demands. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.90	$2.20
Retailers, carload lots	1.95	2.25
Retailers, less than carload lots	2.05	2.35

Chicago.—As in other Wire products, new business has slackened considerably, but specifications are heavy. Present official figures in car lots to jobbers at Chicago are as follows: Painted Wire, $2.05; Galvanized, $2.35; retailers, car lots, 5 cents higher; less than car lots, $2.20 Painted; $2.50 Galvanized. Staples, Bright, $2; Galvanized, $2.30.

Pittsburgh.—A fair volume of business is being received, which with old contracts, will serve to keep the mills fully employed for some time to come. The market is firm, but the expected advance in prices by the leading interests has not yet been made. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.90	$2.20
Retailers, carload lots	1.95	2.25
Retailers, less than carload lots	2.05	2.35

Smooth Fence Wire.—The demand exceeds that usual at this season, while specifications on contract orders are coming in freely. The market is firm in tone and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.60
Retailers, carloads	1.65

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—Both buyers and sellers are satisfied to await developments before exercising great activity as far as new business is concerned. Specifications on contracts are unusually heavy for midwinter. Owing to high prices for raw materials there is little temptation to shade official prices, which are $1.75 for base sizes of Annealed Wire in car lots to jobbers, $1.80 in car lots to retailers, with 5 cents extra for less than car lots. Galvanized Wire maintains its regular extra of 30 cents over Annealed.

Pittsburgh.—New tonnage is larger than usual at this season of the year, buyers continuing to place liberal orders in view of the expected advance in prices. The market is firm and some of the independent mills are not inclined to take on more tonnage than they can avoid, in view of the expected higher prices. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.60
Retailers, carloads	1.65

Sheet Zinc.—January 7 another advance was announced in Sheet Zinc, the price being made $7.50 per 100 pounds in 600-pound casks, f.o.b. mill, subject to the usual discounts for cash and quantity.

Chain.—A meeting of the leading Chain manufacturers was held in Pittsburgh on Tuesday, January 10, at which prices on Machine Made Chain 3-16 to 1¼ inches in diameter were advanced 1-10 cent a pound, or $2 a ton.

Paris Green.—A gentlemen's agreement has been entered into by a majority of the manufacturers of Paris Green to maintain the schedule of prices which has been agreed upon. Outside manufacturers who are not parties to the agreement are quoting the same prices at present, but are not bound by any agreement. The base price for Arsenic kegs is higher than that at the beginning of 1904, and the advances for smaller packages are larger.

The advanced prices are justified, it is claimed, by the higher cost of the raw material. The new prices are graded according to the quantity purchased, which is favorable to the jobbing trade. It is problematical whether the agreement will hold. The prices announced for strictly pure Paris Green, subject to change without notice, f.o.b. New York, terms 30 days net, or cash less 1 per cent. in 10 days, in quantities of 10,000 pounds and over, are as follows:

	Per lb.
Arsenic kegs	12 c.
Kegs, 100 to 175 pounds	12½c.
Kits, 14, 28 and 56 pounds	13½c.
Boxes, 2 and 5 pounds	13½c.
Boxes, 1 pound	14 c.
Boxes, ½ pound	15 c.
Boxes, ¼ pound	16 c.

These prices are subject to the following differentials:

	Extra.
5000 to 10,000 pounds	½c.
1000 to 5000 pounds	1 c.
500 to 1000 pounds	1½c.
Less than 500 pounds	2 c.

Rope.—Factories are not very busy, as is usually the case at this season. Some are giving their plants the annual overhauling, others are running on part time, while still others are operating full time. Business is light, though the prospects for a good demand the coming season are regarded as excellent. Quotations are as follows: Pure Manila, 11¾ to 12 cents; Mixed Manila, 10 to 10¼ cents; Pure Sisal, 10 cents; Mixed Sisal, 8 to 8¼ cents per pound.

Window Glass.—The general tendency is toward a stiffening in prices owing to the demand, which is up to the expectation of manufacturers. A meeting of the Executive Committee of the Manufacturers' and Jobbers' Window Glass Company is to be held in the near future to canvass the situation, and it is considered possible that the minimum price may be advanced. Independent manufacturers held a meeting last week, the object being to form an organization through which prices could be regulated according to trade conditions. The meeting adjourned without definite action being taken, but another meeting will probably be held in a week or ten days. Local demand is better than for some time. New York quotations are as follows: First two brackets, single, 90 and 15 per cent. discount; larger sizes single and all double strength, 90 and 5 per cent. discount; all from jobbers' list of October 1, 1903.

Oils.—*Linseed Oil.*—The local market is quiet, the usual demand for small lots having shown a falling off, probably on account of inclement weather. Crushers of State and Western Oil would possibly accept contract orders at a cent under quotations for large lots, but buyers are not covering future requirements. Specifications are not being received for shipment on contract orders already on crushers' books, buyers deferring the shipment as long as possible. Linseed cake is still in light demand. Notwithstanding present conditions there is a continued feeling that Oil prices will be advanced. Quotations are as follows: City Raw, 43 to 44 cents, according to quantity; State and Western, 41 cents per gallon, for large or small quantities. The continued drop in prices of Crude Oil has resulted in a reduction of ½ cent per gallon on all grades of Lubricating Mineral Oils.

Spirits Turpentine.—In view of the recent weakness in Southern markets and the expectation of lower prices, the stronger feeling now reported is attributed to an attempt to force up prices artificially. Conservative buying is likely to be the rule until conditions change. There is a moderate demand in the local market confined to small lots. Prices have advanced 1½ cents per gallon during the week, as shown by the following New York quotations, which, according to quantity, are as follows: Oil barrels, 54 to 54½ cents; machine made barrels, 54½ to 55 cents per gallon.

THE Chicago Retail Hardware Association will hold its twelfth annual ball and reception at Illinois Hall, Chicago, Wednesday, January 25.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses and are referred to the manufacturers:*

FROM THE VIRGINIA-TENNESSEE HARDWARE COMPANY, a corporation with $50,000 paid up capital, which has bought the stock of merchandise and good will of the J. M. Barker Hardware Company, Bristol, Tenn., and will take over the business on February 1. The officers of the new company are Wm. J. Brown, president and treasurer; Wm. J. Fickle, vice-president, and D. B. Mullins, secretary, who will be the active members of the new organization.

FROM T. T. GILLESPIE, Homestead, Pa., who has opened up in the Shelf and Heavy Hardware, Stove and Paint business in the location formerly occupied by the Orr Hardware Company.

FROM THE BIALY HARDWARE & SUPPLY COMPANY, Bay City, Mich., which has been incorporated with a capital stock of $20,000 to carry on the wholesale and retail business.

FROM THE HORNOR HARDWARE COMPANY, Lumberport, W. Va., which has been organized with a capital of $10,000 to conduct the Hardware, Stove, Implement, Paint and Sporting Goods business.

FROM EDWIN C. ANDERSON, Taylorville, Ill., who has succeeded Adams Bros. in the general Hardware business.

FROM BRESSLER & Co., Palmyra, Pa., who have lately opened up in the wholesale and retail business in Shelf and Heavy Hardware, Stoves, Agricultural Implements, Paints, Sporting Goods, &c.

FROM WM. B. ROCHESTER, Winchester, Ind., who has recently commenced business as dealer in Shelf and Heavy Hardware, Stoves and Tinware and Sporting Goods.

FROM W. T. GODFREY & Co., Shoshone, Idaho, who have just opened a new store, handling Shelf and Heavy Hardware, Stoves, Paints and Sporting Goods.

FROM JONES & SON, Peckham, O. T., successors to G. F. Moore in the general Hardware business.

FROM HAY MERCANTILE COMPANY, Hay, Wash., dealers in Shelf and Heavy Hardware, Paints, &c., which has commenced the erection of a large building west of its store which will be devoted to a stock of Agricultural Implements.

FROM THE CARPENTER HARDWARE COMPANY, Athens, Ohio, which will open up in the wholesale and retail Hardware business at that point February 1. The company has retail stores at Gloucester and Nelsonville, Ohio.

FROM CHANDLER LUMBER COMPANY, Gravity, Iowa, which has recently taken up the sale of Hardware, Stoves and Tinware in connection with its lumber business.

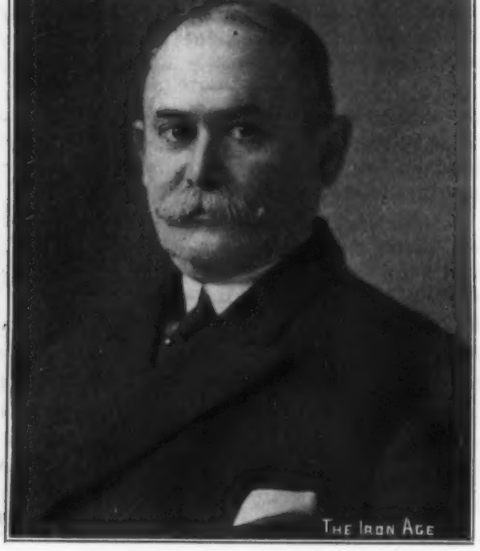
FROM STANDARD HARDWARE COMPANY, 438 and 440 East Jersey street, Elizabeth, N. J.

FROM W. E. BARNES, Guthrie, Ky., who about February 1 will begin business as dealer in Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c., in a new store, 50 x 80 feet, now being pushed to completion.

DEATH OF FAYETTE R. PLUMB.

FAYETTE R. PLUMB of Fayette R. Plumb, Incorporated, manufacturer of Edge Tools, Philadelphia, Pa., died suddenly on January 7 from pleuro-pneumonia at Hot Springs, Ariz. Mr. Plumb left Philadelphia December 31 on a trip to the Pacific Coast, and was accompanied by his daughter, Miss Georgiana R. Plumb, who intended spending the winter months at Hot Springs. A sad feature of the case was that the trip was undertaken in the hope that it would benefit Miss Plumb, who is in extremely delicate health. Mr. Plumb was, however, taken ill on the train, and despite medical aid died early Saturday evening, when within 20 miles of their destination.

Fayette R. Plumb was born in Gowanda, N. Y., May 2, 1848. He had a common school education and at the age of 14 he attended Fredonia Academy in Chautauqua County, N. Y. He later attended the Model School at Trenton, N. J., and graduated from Williston Seminary, East Hampton, Mass., in 1867. In the same year Mr. Plumb began his commercial life in the employ of Lloyd,



FAYETTE R. PLUMB.

Supplee & Walton (now the Supplee Hardware Company), Philadelphia. In 1869 he associated himself with John Yerkes, who had a small plant in Frankford, near Philadelphia, for the manufacture of Edge Tools. Later he became a member of the firm, the firm name being Yerkes & Plumb, and the works were moved to Bridesburg. It was about this time that the firm began to use cast steel for tools, and they were among the first manufacturers in the United States to use that material. In 1888 Mr. Plumb bought out his partner, who retired from active business, and from time to time since then the works, which were later moved back to Frankford, have been enlarged. To-day there are employed in them 500 hands. Six years ago the firm was incorporated under the name of Fayette R. Plumb, Incorporated, with Mr. Plumb as president. In 1870 Mr. Plumb was married to Miss Kate C. Middleton, daughter of Mr. and Mrs. Geo. C. Middleton. He is survived by a widow and six children, Ralph H. Plumb, Fayette R. Plumb, Jr., Miss Georgiana R. Plumb, Miss Edith W. Plumb, Joseph H. Plumb and William D. Plumb. Arrangements have been made for bringing Mr. Plumb's body to his former home, Merion, Pa., near Philadelphia, for interment, and the funeral will be held either on Saturday or Monday, January 14 or 16.

Mr. Plumb was very active in various Hardware associations, being instrumental in the organization of the Philadelphia Hardware Manufacturers' and Merchants' Association, and later the American Hardware Manufacturers' Association. He had served both organizations as president, the latter during two terms, and at the time of his death held a high position in its advisory board. Mr. Plumb had been a member of the League of Philadelphia since 1876. He served as a director during 1895 and 1896. He was also an active member of the Manufacturers' Club of Philadelphia and was at the time of his death serving his fourth term as its president. A meeting of the Philadelphia Hardware Manufacturers' and Merchants' Association was held at the rooms of the association on Tuesday, at which feeling addresses were made by Messrs. Supplee, McCaffrey, Ritter, Fernley and Griffith. A committee consisting of William W. Supplee, Samuel Disston and John R. Griffith was appointed to draft a series of resolutions appropriate to the event.

In the death of Mr. Plumb Philadelphia loses one of its most public spirited citizens and the trade, in which he had a wide acquaintance, will learn of it with profound regret, as he was held in high esteem not only as a leading manufacturer but as a man of high character and attractive personality, with many gentle and kindly traits and of sterling worth, which won the respect and good will of all and endeared him in a peculiar manner to those who knew him well.

DEATH OF JOHN BRIGGS.

JOHN BRIGGS, treasurer of Peter A. Frasse & Co., 92-94 Fulton street, New York, died January 5. Mr. Briggs was born in Philadelphia in September, 1851, and came to New York to accept a position with the old house of Frasse & Co., in what is now Park Row, in 1871. He remained there until 1890, when, after a short service with Montgomery & Co., he became affiliated with Peter A. Frasse & Co. On the incorporation of the company in 1891 Mr. Briggs became assistant secretary, and on the death of the president, John L. Howe, in October, 1901, succeeded to the treasurership. Mr. Briggs was a Mason in high standing, and was also prominent in military circles, having been captain of Company E, Fourth New Jersey National Guard, which position he resigned to become Judge Advocate. He is survived by a widow and a son.

THE PRITCHARD-STRONG COMPANY.

THE PRITCHARD-STRONG COMPANY, Rochester, N. Y., has issued a catalogue in which is shown an interesting line of Hardware and household specialties, including quite a number of new goods. Among the articles represented are Double Head Tacks, Sink Cleaners, Tack Pullers, Can Opener, Potato and Apple Parer, Garden Trowels, Shoe Horns, Corkscrew, Ice Picks, Towel Holders and Racks, &c. Leaflets illustrate a new Bread Mixer and a Check Protector. The company is also getting out a new line of Tubular Lanterns.

BALDWIN REFRIGERATOR COMPANY, Burlington, Vt.: Catalogue of nearly 100 pages showing its 1905 line of Metal, Spruce, Porcelain and Opal Glass Lined Refrigerators and Sectional Casters. About 140 styles and sizes are manufactured. A separate circular calls attention to the company's Oak Cased Nicolene Lined Refrigerator, which is lined with nicolene, a bright metal that is said not to tarnish or corrode.

ALFRED FIELD & Co., 93 Chambers street, New York, advise us that recently the patterns of French Pliers and Nippers made by L. Hugoniot Tissot, for whom they are sole agents, have been copied, and are being offered for sale under their numbers. They, therefore, desire to caution the trade to look sharp if they want the genuine Tissot Tools.

FRANK L. NICHOLS has been made manager of the sales department of the Colt's Patent Fire Arms Mfg. Company, Hartford, Conn. The office is a new one, created at a recent meeting of the Board of Directors. Mr. Nichols has been a traveling salesman for the company since September, 1901, and his promotion is regarded by the officials as one well deserved. He was formerly with E. C. Stearns & Co., Syracuse, N. Y.

A FIRE in the building, 104 Reade street, New York, on the night of the 7th inst., resulted in some loss by water to the merchandise and fixtures of Livingston Nail Company. It will, however, cause no interruption to the company's business. The loss is fully covered by insurance.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

PROFITS IN PAINTS FOR THE HARDWARE MERCHANT.

There is a good, clean profit in this line which for various reasons is often turned down by many merchants.

EVERY spring and all the year through the housekeeper insists that her home must blossom with brightness and cleanliness! There are floors to refinish, wood work and furniture to be varnished, stained or enameled, chairs and lawn swings to be decorated, the baby carriage and the flower stands ditto, and a thousand and one other things to be considered in the general renovating.

For the man of the family comes the house, the barn the fences and the outhouses, the farm implements, the wagons and the family carriage.

What one line of goods, then, is so universally in demand as that of Paint and the various accessories? To get a share of this business, which is waiting for many of us with open arms, requires only a fair stock of the right kind of goods—goods in which you have implicit confidence in selling and recommending to a customer, goods for which you will have no excuses to offer as to quality. Then it is up to you to sell them, and you WILL sell them all right if you are cut out to sell goods at all.

Universal Demand

The Stock of Paints

need not necessarily be a large one nor the investment a great one. This is the mistake so often made in a new line, and the thought of it is a bugaboo to many a would be dealer. Many successful dealers have begun with a $20 line of small box Paints to retail at 15 and 25 cents, and 10-gallon cans of Oils and Turpentine, &c.

$20 Worth for a Start

It's better to be a believer in the beginning, but if you are not then start in as small a way as possible. There is no class of goods that turns itself oftener during the year than a Paint stock, so that if what you buy is fairly good there is absolutely no danger of "falling down" on your stock. Even with a small stock for a first one, the balance will come before you know it. The writer went through the experience of beginning the line with nothing but Linseed Oil, Turpentine, White Leads and a few Brushes—these being the least profitable of all the line—but the development was such that in sort order other and many parts of the line were added, and to-day we count it the most profitable portion of a large stock, and with it all we do not sell a painter contractor unless he has the money in his clothes to pay for the goods.

A Turning-Often Stock

Some Objections

are offered, and the statement that we do not sell to painters except for cash is made in the light of the fact, that as a rule the trade is not a good one to sell to, in that it is generally unreliable and irresponsible. This is true in almost any locality, and yet there is a wonderful sale for the goods outside of the trade. The time is at hand when nearly every man, woman and child does some work of this kind and delights in doing it. The great bulk of the goods is sold to those who are not in the trade and are in no sense painters.

Another objection frequently offered is "losses in the handling," losses by evaporation, losses in measuring and in selling; all of these can be corrected in a business way as you would correct any other losses in your establishment. Another is the outlay of capital. As stated before, there is no one stock when well assorted that so quickly turns itself and is ready to pay its bills before they are due in the goods sold.

Losses

It's Up to the Dealer,

after his stock is secured, as to whether or no it isn't one of the best on his shelves. It means the goods must be kept clean and neat—kept to the front always. They must be displayed and given show window room. The line admits of artistic display. Possibly no line makes a better display than well labeled Mixed Paints, large and small, with Brushes, Dry Colors, Varnishes, Stains, Enamels, &c., and the attention given the show window in these days is a guarantee of sale for any goods put in it. With the goods in the window it's a good idea to add some of the results of their use; for instance, a picture frame stained or gilded, a chair varnished or enameled, a Wheel finished in your Carriage Gloss, a Foot Tub showing finish with Bathtub Enamel. There are dozens of ways of showing results of the goods you carry.

Show Them

How to Do It

A Small Stock

may be anything you want to make it in this day of many lines to choose from. The lines that bear the most profits would, of course, suggest themselves, and those that are being largely advertised, and because of this almost sell themselves, are safe and profitable always. The writer would suggest a line of ½ pints in all staple colors, for which the maker will furnish YOUR color cards. Add to this a small stock of Varnish Stains, Bathtub Enamels, Carriage Gloss in Black, Carmine and Green—all in ½ pints and perhaps pints.

Safe Lines

Then you'll want a dozen or so of Aluminum and a box of Liquid Gold Paint. You can add the Jap-a-lac line or a similar stock, and with the above a small line of Brushes, 1, 1½ and 2 inch, if you care to go no further.

Average Full Line.

Take my word for it, you will rapidly add the balance of the line. An average full line is as follows:

Linseed Oil
Turpentine
Japan Dryer
Asphaltum
Varnishes
White Lead
Zinc
Surfacers
Fillers
Varnish Removers
Dry Lamp Black
Dry Blues
Dry Greens
Dry Yellows
Dry Ochers
Dry Reds
Pumice Stone
Grate Varnishes
Varnish Stains
Aluminum
Gold Paints
Flat Colors
1-pound Colors in Oil
1-pound Colors in Japan
Enamels
Carriage Glosses
Metallic Paints
Mixed House Colors
Mixed Roof Colors
Floor Paints
Wall Finishes
Banana Oil
Gold Leaf
Bronzes
Steel Wool
Paint Brushes
Dusters
Wall Brushes
Artists' Material
Papering Brushes
Roofing Brushes
&c., &c.

None of these are mentioned for any other purposes than to show the possibilities in the business. There is so much to it and so much is being continually added that to many it might seem almost discouraging to go over the list. But such is not the case, for you do not by any means have to carry all the line, except as you want to add to it, and you will sell what you do carry regardless of the balance if the goods are given half the chance that the average stock is. The goods now come so beautifully mounted and ready for display that all they ask is the latter. Like any other goods, they cannot be put under a counter or set away on the shelves and be expected to sell. It is a class of goods that people are continually on the hunt for—more particularly the women

Women and Paint

folk, who are the great customers for the small and profitable "box goods."

The best evidence the writer knows of the desirability and profitableness of the Paint line is the fact that he cannot recall a single instance in which the Hardware merchant has taken it up and ever gone backward—*i. e.*, ever discarded it or pronounced it other than a money maker. There are many other lines in the business that could well be given up for it to advantage. We are glad to see more and more of it as a staple Hardware stock, increasing as the years go along, and always on the increase.

Once Tried Always Used

H. C. W.

PACIFIC HARDWARE & STEEL COMPANY.

TWO new buildings are in course of erection for the Pacific Hardware & Steel Company, San Francisco, Cal. The main building occupies a frontage of 275 feet on Townsend street, 264 feet on Seventh street and 275 feet on King street. It is of brick and very heavy mill construction, fully capable of supporting the weight of the large stock of merchandise carried by the company. The building is divided practically into three separate parts by heavy brick fire walls running from Townsend to King street. The structure will consist of a basement and three floors and will furnish 336,600 square feet of floor space, or about 7¾ acres.

On the first floor of the building will be situated the Sporting Goods and Cutlery stock rooms, the general Shelf Hardware stock rooms, the Builders' Hardware stock rooms and all classes of goods that are carried on shelving. In the center of this first floor will be the packing room and order department, and on the King street and Townsend street fronts will be the shipping and receiving departments. On the second floor and in two rear sections of the third floor will be carried the surplus stock of all kinds and the stock of Stoves, Plumbing Goods, &c. The general offices will be situated in the third story and will occupy the entire Seventh street frontage, giving floor space of about 25,000 square feet. These offices will be splendidly lighted and ventilated by numerous windows and skylights.

Four hydraulic and five electric freight elevators, together with one electric passenger elevator, will give rapid and ample transportation from the basement to all the floors of the building. Commodious quarters for the catalogue department will be situated in the third story, from which the company's complete loose leaf catalogue will be issued and kept alive.

Ample trackage facilities on the company's own ground on the Townsend street front of the building will allow for the loading or unloading of ten cars at one time. Trucks and wagons will receive and deliver goods from the King street front of the building, where a platform elevated above the street and covered by a glass hood 550 feet long will protect the goods in the course of loading or unloading from exposure to the weather.

A complete and elaborate system of fire protection will be installed, consisting of 6000 sprinkler heads and ample fire extinguishers and fire hose. Pneumatic tubes and telephones place all departments of the establishment in quick communication with each other.

Adjacent to the main building, and occupying a piece of ground measuring 175 feet on King street and on Townsend street and extending through the block 264 feet, is located the large iron and steel warehouse of the company. This is a very heavily constructed one-story building, 30 feet high in the clear, and in it the company's immense stock of Boiler Plates, Sheet Iron, Boiler Tubes, Pipe and Bar Iron will be carried. Two large electric traveling cranes furnish a ready and economical method of handling the stock in this building and delivering it from and to cars and trucks.

Next to the iron warehouse the company has left unused a piece of ground measuring 100 feet on King street and on Townsend street and 275 feet deep, upon which additional buildings will be erected in the near future. The estimated cost of the two buildings referred to above is $500,000.

DEATH OF GEORGE ALLEN.

GEORGE ALLEN, senior member of the Hardware firm of Allen & Lotts, 169 Summer street, Boston, Mass., died very suddenly on the 2d inst., aged 84 years. He was stricken while in the South Station, about to take a train for Newton, and expired soon afterward at Hotel Essex, where he was taken by his son, Edwin E. Allen, who was with him. Mr. Allen was born in Boston in 1820, and was first employed in the Hardware store of James Butler on Union street, about 1837. He remained with this employer until January 1, 1845, when he went into business for himself, forming a partnership with William Noble, the firm name being Allen & Noble. This firm continued until 1887, when the present firm of Allen & Lotts was formed. Mr. Allen retained an active place in the management until his death. He had been a resident of Boston and Newton all his life, of recent years having homes in both cities. As a resident of Newton he was one of the Building Committee of Grace Episcopal Church. He was a member of the Old School Boys' Association. He leaves a widow, two sons and a daughter.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

THE AMERICAN HARDWARE MFG. COMPANY, Buffalo, N. Y.: Catalogue illustrating Refrigerator Locks, Fasteners and Hinges, Lid Lifts, Door Pulls, Milk Bottle Lock, Drawer Pulls, Pipe Wrench, Sportsman's Match Safe, House Numbers, Key Blanks, &c.

CLEVELAND LOCK COMPANY, Cleveland, Ohio: Illustrated price-list No. 14, relating to Hasp Lock and Latch, Knife Handle Husker, Hercules Strap and T Hinge, Hercules Improved Screen Door Hinge, Safe Edge Vegetable Forks, Yankee Lawn Sprinkler, Miners' Candlesticks, Square Boring Bit and Hercules Steel Shelf Bracket.

STAR SHOVEL & RANGE COMPANY, Vincennes, Ind.: Illustrated folder devoted to Shovels, Spades, Scoops and Drain and Ditching Tools.

WEED CHAIN TIRE GRIP COMPANY, 28 Moore street, New York: Illustrated catalogue describing Weed's Patent Chain Tire Grip for automobiles.

POPE MFG. COMPANY, Eastern Department, Hartford, Conn.: Crawford Bicycle catalogue, showing three models of men's, two of women's and one each of boys' and girls'.

THE STOVER MFG. COMPANY, Freeport, Ill.: Ideal Hardware catalogue, devoted to Mop Heads, Steel Brush Attachments, Lamp Brackets, Lemon Squeezers, Handled Hammers, Thumb and Barn Door Latches, Drawer Pulls, Screen Door Hardware, Chest Handles, Foot Scrapers, Shoe Vises, House Numbers, Shelf and Sink Brackets, Dampers and Damper Clips, Stove Cover Lifts, Pokers, Sash Pulleys, Blind Hinges, Refrigerator Spring Hinges and Locks, Screen Hinges, Double Acting Jamb Spring and Floor Hinges, &c.

GOODELL-PRATT COMPANY, Greenfield, Mass.: Catalogue showing the extensive line of Tools made by the company, which includes so many additions to the line, as well as changes and improvements in older Tools, that the suggestion is made that merchants study carefully the 176 pages devoted to them.

J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass.: Pamphlet devoted to Stevens Rifle Telescopes, containing supplementary list of new goods, with corrections of present catalogue.

THE HOLLAND MFG. COMPANY, Baltimore, Md.: Illustrated pamphlet relating to Double Pointed Tacks, Glazier Points, Staples, Tacks, Trunk and Clout Nails, Strap and T Hinges, Loose Pin Wrought Butts, &c.

BEALL BROS., Alton, Ill.: Catalogue of Miners' Tools and Supplies. The manufacturers state that they have constantly added to their lines, so that they now make a very extensive assortment.

BEALL SHOVEL COMPANY, Alton, Ill.: Catalogue of Shovels, Spades and Scoops. In this catalogue the attempt has been made to give complete price-lists as well as illustrations and dimensions of the company's line of Plain Back (Antrim) and Hollow Back (Cleveland) goods.

LUFKIN RULE COMPANY, Saginaw, Mich.: Booklet, entitled "Advertising Specialties," in which is shown a number of the company's Measuring Tapes and Rules, which are adapted for advertising purposes.

BUTLER BROTHERS' JERSEY CITY WAREHOUSE.

BUTLER BROTHERS, 491-497 Broadway, New York, wholesalers of general merchandise to the trade only, have just finished and occupied a fine new warehouse in Jersey City, N. J., costing about $1,000,000. This radical departure in the conduct of their business has been forced upon them by the marvelous growth of New York, which makes it a physical impossibility to expeditiously handle their business owing to congested streets, depots, piers, &c., the receipt and dispatch of goods being thus hampered. In the language of a high official of the company, "New York is easily first among American cities in all that makes for commercial supremacy, not only in financial ways, but in buying and selling merchandise; but the very vastness of the business done imposes a heavy handicap on those who actually handle merchandise within its narrow limits. It is a manifest destiny," he continued, "that the actual handling of merchandise by New York jobbers shall overflow to Jersey City or other of the suburbs where land is cheap and plentiful railroad tracks run to the very door. Lower Broadway is a clearing house for the buyers and sellers of America. There the men who make the goods and those who distribute them meet and mix as they cannot do on any other single street in this hemisphere. But there is no more reason why the actual handling of merchandise should be done there than that one should hire for storage an expensive room on a main street when good enough quarters nearby can be obtained at a fifth of the cost."

The new building was planned last spring and has been erected practically since August last, the company occupying it the first business day of the new year. It is admirably located for their purpose on the block bounded by Washington, Morgan, Warren and Bay streets, but two blocks from the North River, and it almost joins the Pennsylvania Railroad Company's New Jersey terminal. It covers a ground area of 200 x 400 feet, has eight stories and basement, giving a total floor area of 520,000 square feet or about 12 acres. The material used in the walls is a light red brick, with banded courses of dark purple brick worked out at each window line. There are iron frame, automatic wire glass windows, automatic closing doors and automatic sprinklers throughout. The building is divided into three parts by two fire proof vestibule sections, which contain all elevators, toilet rooms, ventilating shafts, &c., and there are 10 large elevators operated by their own electrical service, which also supplies the electric lighting system. The floors are water proof and built like the deck of a ship—that is, with a slight pitch from the center to the walls, along which are copper scuppers leading outside, so that in case a floor is flooded the water will readily run off without damaging the floors below. The top floor, where the main offices are located, has saw tooth skylights, giving an abundance of light, with no direct sun and no shadow. The roof has been finished as a summer garden, and will be open to all employees during luncheon hour. Each employee has an independent sanitary locker and there is hot and cold water on every floor, with automatic electric pump for circulating filtered water throughout the building. There is a large and comfortable smoking room for the men and a commodious lounging room for the women employees.

All the floors are well lighted naturally and artificially, a large amount of space being given to the storing of original packages as received from the manufacturer, while open stock is kept in large slatted bins, the aisles of which as a rule have a window at each end. There are large fire proof vaults for explosives, such as Ammunition, &c.; also immense assembling and shipping rooms, awning covered receiving and shipping outside platforms and spurs running to the building from the various trunk line railroads which reach New York, from Weehawken to Communipaw, thereby insuring the quick receipt and shipment of goods.

The stock formerly carried at 491-497 Broadway and at their storage warehouses in New York is now concentrated in this building, and in the immediate future their large modern building on Broadway of ten floors, running through to Mercer street, will be remodeled so as to adequately sample all the goods dealt in for the inspection of customers in charge of house salesmen, the house having no salesmen on the road, the entire business being done by catalogue to the trade only. The buyers will also have quarters in the building as will some of the executive officers; with these exceptions the entire force is now stationed in Jersey City. The company also has two immense buildings in Chicago, arranged on similar lines, and a St. Louis branch at 1221 to 1237 Washington avenue.

The officers and directors of Butler Brothers are as follows: President, Edward B. Butler, Chicago; vice-president, Homer P. Knapp, St. Louis; secretary, Walter Scott, New York; treasurer, John R. Schofield, Chicago; assistant treasurers, Chas. E. Bryant, New York; Edward Sheehy, St. Louis. Directors: Edward B. Butler, Homer P. Knapp, Walter Scott, John R. Schofield, Homer A. Stillwell, Frank S. Cunningham and J. H. Schoonmaker.

NORTH DAKOTA RETAIL HARDWARE ASSOCIATION.

THE programme for the annual meeting of the North Dakota Retail Hardware Association, which will be held at Fargo on February 1, 2 and 3, has just been determined. It promises a meeting of more than usual interest and should draw out a large attendance of the members. The different sessions will be held at the quarters of the Fargo Commercial Club, the hotel headquarters being at the Metropole. Among the formal addresses will be the following:

"The Science of Salesmanship," by A. F. Sheldon of Chicago.
"Heating and Ventilating," by O. M. Roberts, Roberts Heating & Ventilating Company, Minneapolis, Minn.
"Credits," by F. J. Hopkins, manager credit department Janney, Semple, Hill & Co., Minneapolis.
"The Evolution of the Stove Business," by G. L. Nye, Minnesota Stove Company, Shakopee, Minn.
"The Modern Tinshop," by E. L. Garden of Souris, N. D.
"Catalogue House Competition," by R. L. Scott, Jamestown, N. D.
"Wealth in Money," by M. G. Evenson, Cooperstown, N. D.

There will also be addresses by a number of prominent jobbers, including R. A. Kirk of Farwell, Ozmun, Kirk & Co., St. Paul; Platt W. Lyon of Janney, Semple, Hill & Co., Minneapolis; W. B. How of Kelley, How & Thomson Company, Duluth; T. G. Walther of Hackett, Walther, Gates & Co., St. Paul, and H. D. Final of Marshall-Wells Hardware Company, Duluth. We understand that the railroads will grant special rates from all points in Minnesota, as well as North Dakota.

AMERICAN COAL & SHIPPING COMPANY, 2 Square de l'Opera, Paris, France, has sent us a copy of a catalogue recently issued, in which a variety of Vises, Wrenches, Mandrels, Borers, Screw Plates, Taps, Hack Saws, &c., are shown. The catalogue is in French, is attractively printed, and satisfactorily represents the line of products to which it is devoted. The company refers to it as a "specimen of a French catalogue brought out by a foreign firm in France.

The New Hardware Store of Hammacher, Schlemmer & Co.

SECOND ARTICLE.

Showcases and Sample Boards.

The showcases in the Hardware department contain samples of Store Door Locks and Handles, Door Pulls,

Fig. 18.—Cabinet Hardware Showcases and Sample Boards.

Push, Pull and Kick Door Plates, Butts and Double Acting Spring Hinges, Door Knockers, &c., all of which are

Fig. 19.—Enlarged View of Sample Board.

placed directly on the red felt covering the bottoms of the cases. Another showcase in this department is devoted to samples of Bathroom Fixtures and specialties, including Towel Bars, Soap Dishes, Sponge, Tooth Brush and Tumbler Holders, &c., attractively arranged.

Sampled on boards in the showcase in the Cabinet section of the Hardware department a portion of which is shown in Fig. 18, are Drop Handles, Drawer Pulls, both ring and bail; Hat and Coat Hooks, &c. The sample board shown in Fig. 19 is an enlarged view of the one standing on the showcase in Fig. 18. The sample boards are all made up of two parts, a frame dove-tailed at the corners and a wood panel held in place by screws. Extra panels are kept on hand to replace those which become unfit for use. The panels are all covered with red colored felt. The frames extend ½ inch above and below the panels, preventing samples and fastenings coming in contact with the felt on the bottom of the showcases or the glass tops of the cases. Usually customers can select such goods as they want from the sample boards without having them taken from the cases. A paper disk tacked by the side of each sample gives the number of the goods.

The reverse of the board in Fig. 19 is illustrated in Fig. 20 to show how the samples are attached. Holes

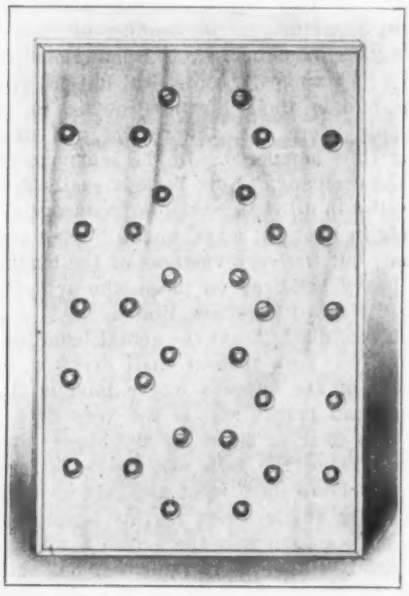


Fig. 20.—Reverse Side of Sample Board.

are bored through the panel and enlarged on the under side. Some of the handles are secured in place by their regular fastenings, while with others it is necessary to cut off the threaded screw, drill and thread a hole in the ends and secure them to the panel with machine screws and washers. In either case the enlargement of the holes permitted the fastenings to be made flush with the bottom of the panel. This plan of protection to the glass and to the felt on the bottom of showcases is followed with all Cabinet Hardware sample boards. Each board has a brass number plate on the side of the frame nearest the salesmen, and a plate with corresponding number is fastened to the bottom of the showcase so that each board may always be returned to the same location in the case. Other samples in the Cabinet Hardware section include Cabinet Escutcheons, Brass and Glass Knobs, Box Hinges, Handles and Corners, Clock Spires and Corners, Desk Rail and Trimmings, &c.

Shelf Drawer Sampling.

Arrangement and sampling of the shelf drawers in this department is much the same as with the Hardware goods. Attention is paid to the order in which goods are sampled on the drawers in this department. This is illustrated in the grouping of Locks, those of the same class but different patterns following each other, for example: Flat Keyed Cylinder, Half Mortise Drawer and Cupboard, Mortise Drawer and Cupboard, Chest and Box Locks, &c. Some of this sampling was shown in Fig. 6, while in the lower left hand corner of the illustration a cut sam-

ple was shown, the Lock having been too long to go on the drawer front in its original form.

Drawers under the ledges are not sampled, as will be seen later, but have the names of the goods contained in them on labels. These goods are arranged in horizontal lines instead of running from the top drawer to the bottom one in each section. Goods are arranged this way on the adjacent shelving of two sections and then begin again at the starting point on the next shelf below. The arrangement is also alphabetical, as, for instance: Caddy Balls, Catches, Corners, &c. Box Trimmings and other goods are arranged in a similar way. Surplus stock is kept in original packages on shelving under the counters, arranged in numerical and alphabetical order.

Flint, Emery and Garnet Paper

is kept in bins under the counter, shown in Fig. 21. The bins are of a size to take a ream each and are just deep enough to accommodate the sheets lengthwise. Drawers are shown in Fig. 22 in which Emery Cloth is

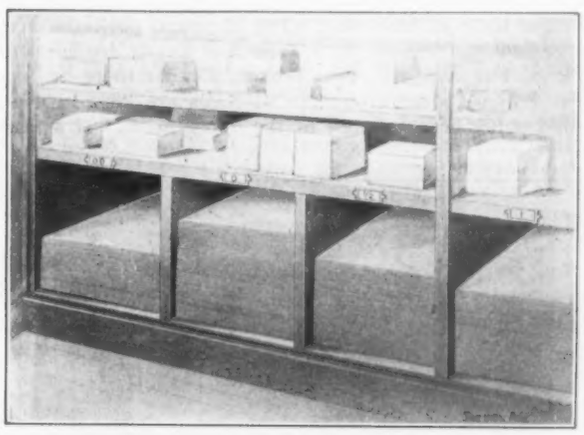


Fig. 21.—Flint and Emery Paper in Bins.

kept. These are of uniform size and accommodate from one to three quires of cloth, according to the grade. The drawers give the Cloth less latitude to curl up than if in bins. Samples of Paper and Cloth are pasted on pages of a book, as in Fig. 23. These fold in the cover and take up but little space when not in use.

Cabinet Escutcheons.

Another instance of the care taken in the arrangement of goods is shown in Fig. 24, which illustrates telescope boxes containing Cabinet Escutcheons. To prevent covers getting on the wrong boxes corresponding numbers are given on each box and its cover. Three or four covers may be taken off boxes at the same time in getting out Escutcheons, and if the boxes were not numbered

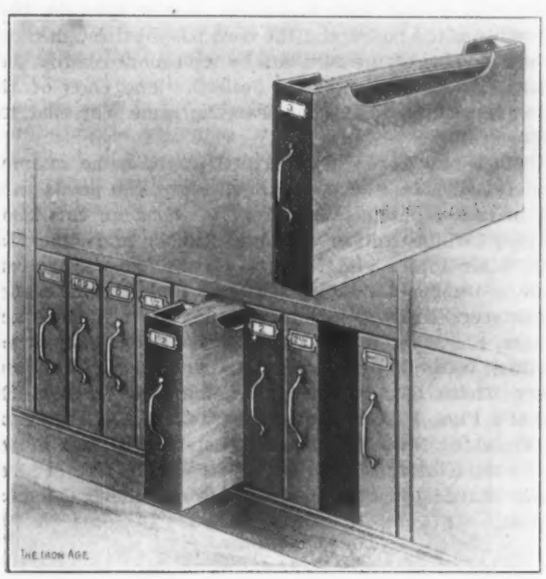


Fig. 22.—Emery Cloth in Drawers.

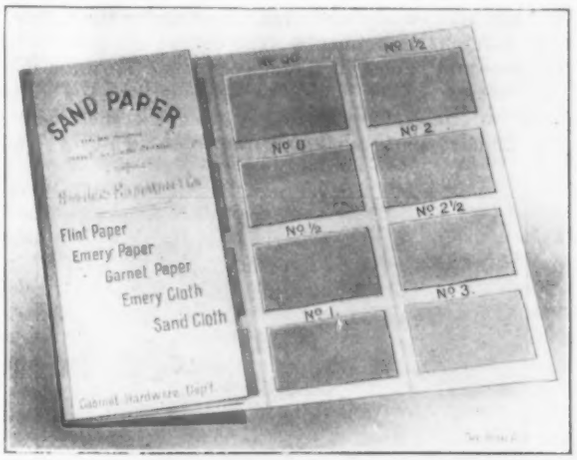


Fig. 23.—Samples of Paper and Cloth.

covers might easily be put back on the wrong boxes. It will also be noticed that the partitions in the drawer do

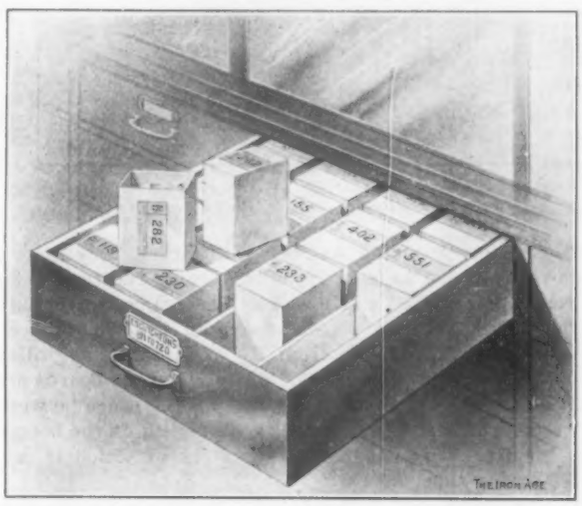


Fig. 24.—Cabinet Escutcheons in Telescope Boxes.

not come to the top of the drawer, making it easy to remove the boxes.

Tacks.

Tacks, of which there is a large variety, are kept in

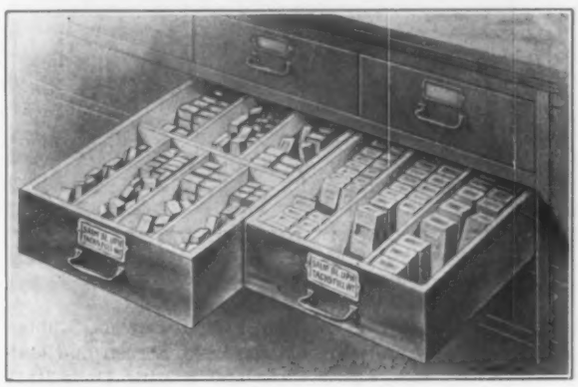


Fig. 25.—Arrangement of Tacks.

drawers, as shown in Fig. 25. An abbreviation of the maker's name appears conspicuously on the labels.

Measuring Chain.

For Measuring Jack and Safety Chain, &c., a measure, in feet, is made by driving brass escutcheon pins along the inner edge of the counter instead of on the top, as is often the practice.

Sliding Sample Boards.

Sliding sample boards like those shown in Figs. 26, 27 and 28, each 11¼ x 18 inches in size, outside measurement, are kept on shelves immediately under the counters in the different departments. The boards are constructed of frames and panels in the same manner as those used in showcases. Each board is provided with a brass handle on one end for taking it from the shelf, and a brass number plate on the handle end, while a plate

Fig. 26.—Sliding Sample Boards in Shelves.

with a corresponding number is attached immediately above the board to insure it always being returned to its proper place. The end pieces of the frame are ½ inch wider than the side pieces, shown in Fig. 26, the end pieces varying in width from 1½ to 2 inches, according to the class of goods sampled on it. When the boards are all on the shelf their faces entirely fill the space between two uprights. Only such goods are sampled on the boards in the Hardware department the stock of which is carried on the upper floors.

The boards are sampled on both sides, and those in this department include Wire Nails and Brads, Cut Nails, Rope, Coil and Sash Chain, small Belting and Belt

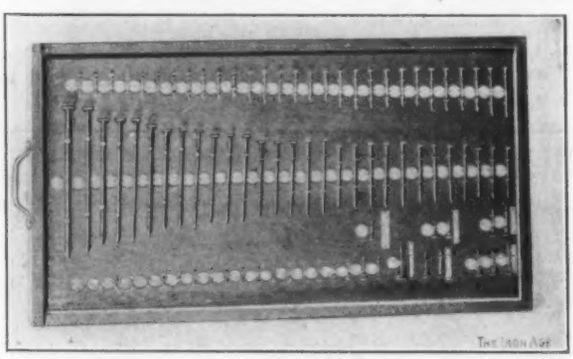


Fig. 27.—Samples of Wire Nails and Brads.

Lacing, Leather Fillet, Weather Strips, Dowels, Rubber Tubing, Bessemer and Brass Rods, Zinc, Screen and Galvanized Wire Cloth, Chair Cane and Sliding Door Rail. The samples are fastened to the boards with round head screws through holes drilled in the samples when the surface will permit it, and in other cases with staples. Wooden dowels are used with the samples of Rubber Tubing to preserve their shape. The samples of Sliding Door Rail are also convenient to try sheaves on so as to determine the size of Rail required for any particular sheave.

It will be seen that the larger sizes of Nails are fastened with screws through drilled holes. Customers wanting any of the goods sampled select the kind they want. An order for the same is sent to the floor on which the goods are kept in stock, and a stock clerk sends the goods down as soon as they can be gotten out, eliminating the dirt and annoyance usually associated with the sale of these lines.

The manner in which Nails and Brads are handled is such as to reduce labor and waste to a minimum. Miscellaneous Wire Nails and Brads are kept in pound paper boxes and in 25-pound wooden boxes. When a customer calls for Nails or Brads, and does not know just the size he wants, the sample board in Fig. 27 is shown him. Each sample is marked with its length and size of wire on a paper disk under it. The customer selects the size he wants and the Nails are ordered down from one of the upper floors. If he should call for 8-penny Nails, for instance, the equivalent in length is ordered for him without showing the samples. Salesmen soon learn the equivalent in size of penny Nails to papered goods. Regular customers usually call for the length and size of the Nails they want, as they have been educated to ask for them in that way. The 25-pound packages are never broken. Penny Wire Nails and Brads are carried in kegs, but kegs are never broken, so that there are no open kegs standing around. Cut Nails are kept in five-pound paper boxes on one of the upper floors. If a less

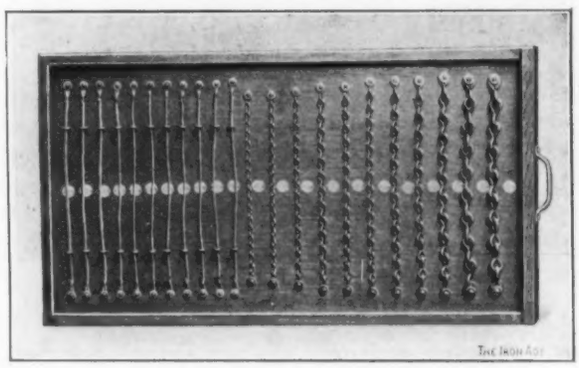


Fig. 28.—Wire Picture Cord and Chain.

quantity than five pounds is wanted it is taken from one of the boxes.

The same arrangement of sample boards is used in the Cabinet Hardware section, one of the boards being shown in Fig. 28. The pieces of Chain are fastened with round head screws, with washers under the head. A loop is first formed at each end of the Wire Picture Cord, after which it is wound with fine wire. Screw eyes are then screwed into the board and the cord passed through them, so that the size of the cord can be seen more readily, and handled by the customer if desired. The ends of the cords are secured to the board in the same way that the Chains are.

Twines and Cords are sampled in the same manner, being raised from the boards. Many of the goods sampled in this department are kept in stock on this floor. Samples include Rubber Matting, Rubber and Zinc Mat Ends, Stair Plates and Nosings, Caster Cups, Furniture Fenders, Rubber Tips, Cabinet Keys and Blanks, Fancy Upholsterers' Nails, Oil Cloth Binding, Stair Buttons and Corners, Eastlake Hinges, Fancy Brass Ornaments, Brass Beading, Wire Picture Cord, Iron and Brass Jack and Safety Chain, Shade Line, Miscellaneous Twines, Escutcheon Pins, Miscellaneous Tacks, Clout, Chain, Trunk and Finishing Nails, Corrugated Fastenings, Panel Points and Irons, Glazier Points, &c. The samples are secured to the boards by screws or staples, whichever is most suitable.

(To be continued.)

THE LINK-BELT MACHINERY COMPANY, Chicago, announces that with increased facilities and improved methods it is able to offer the Ewart Link-Belting of the highest quality at a considerable reduction from former prices. It will be glad to quote new discounts on application.

Letters from the Trade.

The Manufacture of Pocket Cutlery.

From a Manufacturer: What is the future of American Pocket Knife manufacturing? Many important changes in this industry have taken place during the last 20 years. We have seen the old hand forged process of making blades give way to that of drop forging, a change that has generally been accepted as a beneficial one. But of late years we have seen another change in the method of making blades which I fully believe is detrimental to first class quality—namely, that of blanking the blades out of solid cold steel, followed by machine grinding. This process undoubtedly saves considerable expense.

A DETERIORATION.

Under the old system Knives were put together by expert cutlers, each individual cutler having his specialty in accordance with his ability. The cutler was paid a good round price for his labor, and the prices were governed by the Cutlers' Union. To-day there are a number of shops that are making their Knives by gangs of cheap labor, superintended by expert cutlers. Each man in the gang has his particular part of the process to attend to and keeps steadily at that particular work. No Cutlers' Union governs the price of the making. These innovations combine to save a great deal of cost in making, but the resultant goods cannot be considered as equal to those made by the old process.

COST OF GOODS IGNORANCE.

There is another important factor that enters into the question of the future of the business, and that is the springing up continually of new manufacturers, some of them with very little capital, run by ex-workmen, with no business experience, sometimes even aided by concessions made to them (either in cash or in freedom from taxation, or other emolument) by the towns in which they locate. These manufacturers, most of them, do not know how to figure the cost of goods and are continually demoralizing prices.

SPECIAL BRANDS AND WARRANTS.

Again, we should consider as a disturbing element the increase in the demand for special brands, causing the manufacturer increased expense and unending detail. Linked with this we have the pernicious unlimited warrant, through which a manufacturer receives back Knives that have been worn out or badly abused.

TWO CLASSES OF MANUFACTURERS.

We have also another viewpoint from which to consider this question of the future, and that is the division of the manufacturers into two classes—the manufacturer who goes direct to the jobbing trade only, and the manufacturer who sells virtually to the retailer alone. The one that sells to the retailer generally follows the method of sending the salesman on the road on commission or on a division of profits over and above prices fixed for him. As a result of this method of the manufacturer who employs salesmen on division of profits, we find that the salesman is not controlled in any way whatever in regard to the price that he may make on any particular pattern. We find that in this way a salesman will put a Knife out as a leader to the retailer

AT THE EXACT COST TO THE JOBBER

and will attempt to average his profit on other patterns; nor does he adhere to any one particular pattern, but varies his leaders in accordance with circumstances. The jobbers are continually complaining about these cut prices, and naturally turn to the manufacturers supplying them with a demand to reduce their prices in order that they may market their goods in competition with the foregoing.

I contend that the future of the business is not by any means a brilliant one, and unless many of the above troubles are rectified in the course of the next year or so there will be thorough demoralization of the industry.

A Criticism of the Census Bureau.

From an Ohio Manufacturer: There is a matter which we believe to be a great injustice to manufacturers and which we think would stand discussion in trade papers. We have recently received from the Bureau of Census, Department of Commerce and Labor, under the head of Census of Manufacturers, an inquisitorial notice to report to Washington certain matters covered by questions subdivided into various heads. Sections 8, 9 and 10 we deem to be a direct dipping of the Governmental nose into private affairs, which we think every man has a right to keep to himself, yet under an open threat of dire punishment we are forced to reveal certain items of our business. They tell us how tremendously confidential it all is, &c., but what man cares to be confidential with a lot of strangers. It simply amounts to submitting your books to a political inspector who may or may not use the information he obtains. We cannot conceive how these three sections—8, 9 and 10—can in any way whatever be of any benefit or advantage to the people at large and we cannot see why the Department of Commerce and Labor should be given any right to private information that may be abused to an unlimited extent and which if a private individual should come into your office and demand he would either be promptly kicked out or else arrested as a lunatic.

We should like to see this question discussed by the National Association of Manufacturers, American Hardware Manufacturers' Association and others.

THE NEW PATENT LAW IN ENGLAND.

FROM OUR BRITISH CORRESPONDENT.

ON January 1 the provisions of the Patents Act, 1902, went into operation and changes took place in British procedure of an almost revolutionary character. The general theory upon which the new patent law is based is to give greater security to patents. It is probably within the knowledge of most American readers that the issue of letters patent is no guarantee of validity. A patent in this country is hardly considered good until it has passed through the ordeal of the law courts. On the other hand, there is a feeling that the American and German systems give to patentees a false sense of security and place in the hands of permanent officials extensive powers, which may be, and sometimes are, abused.

The British system, with all its imperfections, is free from these objections, and as a practical working scheme it compares very favorably with that in vogue in the two countries which are now our chief commercial rivals. It does, however, have faults, and the object of the new Patents Act is to remove these as far as possible.

The text of the act was framed on the recommendations made by a committee appointed by minute of the Board of Trade, May 24, 1900, to inquire into the working of the Patents Act, and especially to consider whether "any, and if so what, additional powers should be given to the Patent Office to (a) control, (b) impose restrictions on, or (c) otherwise limit the issue of letters patent in respect of inventions which are obviously old, or which the information recorded in the office shows to have been previously protected by letters patent in this country."

It is important to note that the committee was here only asked to deal with the inventions previously protected "in this country," and that in their instructions from the Board of Trade it was expressly laid down that "Her Majesty's Government do not think it desirable and do not propose to establish any general system of examination as to the novelty of inventions in respect of which applications for letters patent are made, and do not require any inquiry into any such system of examination." That is, the Government wisely decided not to introduce the American practice, but sought to find whether our own system could be improved by vesting somewhat larger powers in the Patent Office.

After hearing evidence the committee was of opinion "that the grant of invalid patents is a serious evil, inasmuch as it tends to the restraint of trade and to the embarrassment of honest traders and inventors," and it recommended the institution of a limited form of inquiry by the Patent Office as to anticipation by earlier British letters patent. The Patents Act, 1902, embodies this recommendation, but its operation was suspended until the close of this year in order to give time to the Patent

Office to increase its staff of examiners and to prepare them for the new *régime*.

Fifty Years' Period.

On and after December 31, 1904, therefore, the Patent Office will be to some extent an opponent, or at least a severe critic, of any application for letters patent. By the new act the examiner is required to ascertain whether the invention claimed has been wholly or in part claimed or described in any complete specification of a British patent "deposited pursuant to any application for a patent made in the United Kingdom within 50 years next before the date of the application." That is, the search is limited to British complete specifications, and will cover a period of only 50 years counting back from the date of the application under investigation. The result of this search is to be communicated to the applicant, who will then be at liberty to amend his specification in order to get rid of the objections raised to his claims.

Where no objections are raised the patent will issue in the ordinary course, but in the other event the Comptroller must hear the applicant to allow him to meet the objections, and if he be still unsatisfied, even after amendments have been made in the specification, he must determine whether a reference to any, and if so what, prior specifications ought to be made in the applicant's specification by way of notice to the public. It is expressly enacted that nothing in the statute is to be held to guarantee the validity of any patent.

Danger of Friction.

The scheme here outlined has the force of law now and will come into operation automatically, so that there is little use in criticising it until we see how it works. At the outset it will probably work very satisfactorily, for the present chief officials of the Patent Office have been trained for many years under the old *régime* and will be very cautious in construing earlier specifications against applicants and will not be guilty of any abuse of the new power intrusted to them. The danger will be more apparent in the days to come, when a staff is in power which has only known the new system, and it is almost certain that friction will then frequently occur between the authorities and applicants for patents. At the present moment a new staff of examiners recently elected from the results of a competitive examination is being trained in the work of making searches. It is quite impossible that these young men, few, if any, having previous knowledge of patents at all, can be competent after a few months' experience to construe the claims in such highly technical documents as specifications, and the tendency will be for them to be too strict rather than too lenient. It is therefore earnestly to be hoped that the Comptroller and the chief examiners will severely curb the enthusiasm of their young subordinates, who will be exercising new and extensive powers which may easily become oppressive.

Avoiding Injustice to the Inventor.

It will be noticed that the act does not authorize the Patent Office to refuse the grant of a patent simply as a result of its search for anticipations. The Comptroller has only the right, if he is not satisfied with the final amendments which the applicant is willing to make, to add at the end of the specification references to earlier specifications by way of notice to the public. A reference of this kind will of course seriously reduce in the public estimation the value of a patent, and great care will therefore have to be taken that no injustice is done to the inventor. The public does not realize, as do those who are familiar with patents and patent litigation, how very difficult it is to decide that an invention is covered wholly or partially by a specification of earlier date, and even though a specific reference be not intended to have the effect of such a decision it will be so interpreted by the public.

Discouraging Poor Inventors.

It might have been better if a suggestion of Colonel Harding, a member of the committee had been acted upon in this matter. In a note appended to the report he expresses the fear that the procedure there suggested will lead to tedious and vexatious discussion between applicants and the Department and will discourage poor inventors, and he expresses his agreement with the Solicitor General that the applicant should be left to amend his specification or not as he pleases, but that all the information given him by the office should also be available to the public—that is, the object of the search should be assistance, not control, and all specifications should have printed at the end a note to the public that the list of specifications, if any, to which attention is called in each case can be obtained on payment of a small fee, such as half a crown. That would have been a much better scheme and more in keeping with the spirit of the British patent laws; but we are now to enter upon the era of "specific references" inserted by the order of the Department. It seems to have escaped observation that such a reference, besides injuring a patentee, is bound to enhance the value of the patent to which reference is made, which may, in fact, be less valid than that on which the reference is entered. Thus, a provision merely intended to give notice to the public may only result in benefiting one individual at the expense of another. Every one interested in patent legislation should watch carefully the operation of this part of the new act.

A Mischievous Provision.

One other provision of the act deserves attention: As a corrollary to the institution of the search throughout the specifications of the 50 years preceding the date of an application it is provided by section 2 of the act that no specification bearing a date outside the 50 years of search shall be deemed to anticipate the invention claimed in that application. In other words, any one wishing to set up British specifications as anticipations of an invention patented, say on January 2, 1905, must confine himself to specifications bearing a date not earlier than January 2, 1855. Note the effect of this provision. Suppose that A searches the records at the Patent Office and finds that B had in the year 1850 obtained a patent for a certain invention, which may never have been put in use through being "before its time" or for some other reason, but which could be used successfully now. There is nothing to prevent A going to the Patent Office and obtaining for himself a patent for exactly the same invention as is disclosed in the old specification of B. That might be done under the present law, but any one threatened by A with an action for infringement of his patent would have a complete defense in saying, "Your invention is old and was patented in 1850, and I rely on the specification of that date": but under the new law that defense is swept away, as the old specification of 1850 will not be allowed to rank as an anticipation.

Surely this is a somewhat extraordinary state of affairs—that because the Patent Office for the benefit of the public begins the system of inquiry as to novelty and arbitrarily fixes the period of investigation at 50 years, the public should at the same time be deprived of its right to contest the validity of any patent on the ground that the same invention has been already patented in this country more than 50 years ago.

Only one other remark need be made on this subject. It will be noticed that this limitation as to anticipation is confined to British patent specifications. Now, the technical journals very frequently give accounts of inventions patented each week and each month, and publication of this kind is not touched by the act. We have thus the further curiosity that, while a specification of more than 50 years' earlier date than one of which it forms an anticipation cannot be relied upon for that purpose, a description in a technical journal based on that specification may be relied upon.

The Patents Act, 1902, also contains a section altering to some extent the old provisions regarding compulsory licenses, but it is not proposed to enter upon that subject now. The object of this article is to point out the effect of the changes in the procedure at the Patent Office and to emphasize the necessity for the most careful supervision of the operation of the act lest our Patent Office should become oppressive to inventors and prejudicial to the public interest.

AMONG THE HARDWARE TRADE.

Haynie Bros. are successors to R. M. Haynie in the Hardware Stove, Implement, Paint, Sporting Goods, Wagon and furniture business at Manassa, Col. They have just taken possession of a new building, 27 x 122 feet.

F. A. Locke has lately begun the Hardware, Stove, Implement, Sporting Goods and furniture business at Ashdown, Ark.

The establishment of the Drury & Kelley Hardware Company, Cadillac, Mich., was totally destroyed by fire a short time since. The loss was about $22,000, on which there was insurance of $18,250. The company is rebuilding and expect to be in full operation again by March 1.

Root & Baker, in the Hardware and Implement business at Murray, Neb., have been succeeded by L. B. Underwood.

C. L. & Theo. Bering, Jr., wholesale and retail dealers in shelf Hardware, Stoves, Tinware, Sporting Goods, Mantels, Tiling, Grates, &c., Houston, Texas, have just received a charter from the State of Texas. The name will continue as heretofore. The paid in capital stock is $50,000, compared with the modest capital of $5000 when the business was established ten years ago. R. A. Bond, who has so successfully managed the Builders' Hardware department for the past seven years, has been taken into the corporation and elected secretary. Several other faithful employees will be given a share of stock each in the company. C. L. Bering is president and Theo. Bering, Jr., vice-president and treasurer.

Frank T. Dickey of Monticello, Ind., has purchased the Hardware business of D. O. Marine, at Converse, and will continue at the old stand.

Banting-Sanders Company, Elmore, Ohio, has changed its style to Elmore Hardware Company.

In a recent fire at McDonald, Pa., the Hardware stock of Samuel Shane was slightly damaged by water.

W. J. Talbott & Son, Eldorado, O. T., dealers in Shelf Hardware, Stoves, Sporting Goods, Harness, Buggies, &c., have been succeeded by the W. R. Talbott Hardware Supply House, Mr. Talbott having bought out his father's interest in the business.

W. J. Barton, formerly of the firm of Summers, Barton & Parrott, Johnson City, Tenn., having sold his interest in that firm, has associated himself with Charles Nuchols and they have incorporated under the name of the Barton-Nuchols Hardware Company, succeeding the firm of Lee & Nuchols Hardware Company. The company will occupy a three-story and basement building 30 x 165 feet, also a warehouse 25 x 110 feet on Southern Railroad, and will carry Heavy and Shelf Hardware, Mill Supplies, Vehicles and Farming Implements, in which it expects to do both a wholesale and retail business.

L. F. Darr, Uniontown, Wash., will in the spring erect a new building for the accommodation of his Hardware, Stove, Implement, Paint, Sporting Goods and furniture business.

Stevens' Little Krag Telescope.

J. Stevens Arms & Tool Company, Chicopee Falls, Mass., is offering the telescope shown in Fig. 1, which is especially designed for the Little Krag single shot rifle, but can be fitted to other rifles, especially the magazine rifles that eject the shells from the top. The telescope is mounted forward of the receiver and has several inches eye relief. It is referred to as being very strong, and with the relief it has gives a very large field with a bright illumination. In Figs. 2 and 3 is shown the new Ideal detachable mount. The dovetail blocks are screwed firmly on the top of the barrel, one for the rear mount and one for the forward one, and are held in place by thumb screws. The mounts and telescope come off together. The blocks remain on the rifle and do not interfere with the use of the ordinary sights. After sighting the telescope can be taken off and put on repeatedly with perfect accuracy, it is remarked, and in a few seconds. Screw holes in the dovetail slot coincide with the old Ideal mounts.

Fig. 1.—Stevens' Little Krag Telescope.

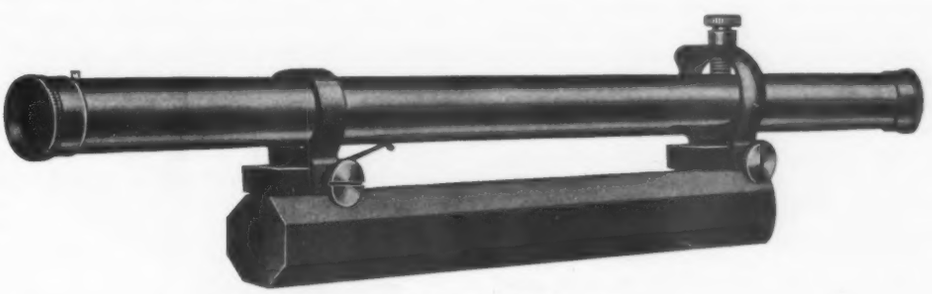


Fig. 2.—Ideal Detachable Mounts.

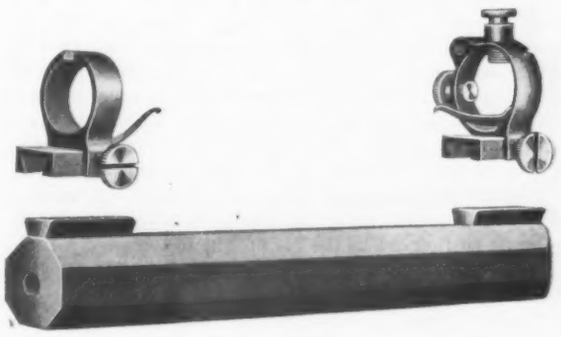


Fig. 3.—Detail of Detachable Mounts.

Weed's Chain Tire Grip for Automobiles.

Weed Chain Tire Grip Company, 28 Moore street, New York, is offering the chain tire grip for automobiles shown in the accompanying cuts. Owing to the variation in diameter of automobile tires the grips are made sufficiently long to fit any make of tire, and one or two of the links can be cut off, if necessary, to make the proper length. The grips resemble a chain ladder, and are laid flat on the ground and the wheels rolled on them. An

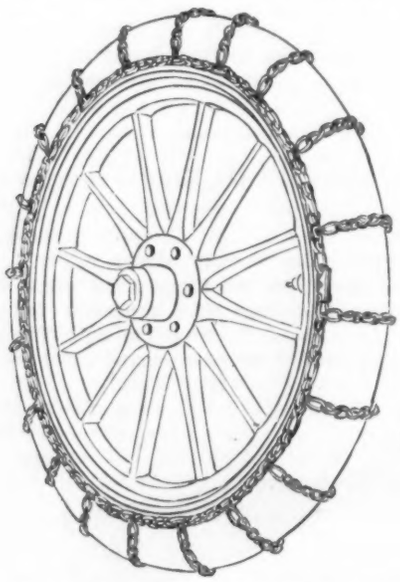


Fig. 1.—Weed's Chain Tire Grip for Automobiles.

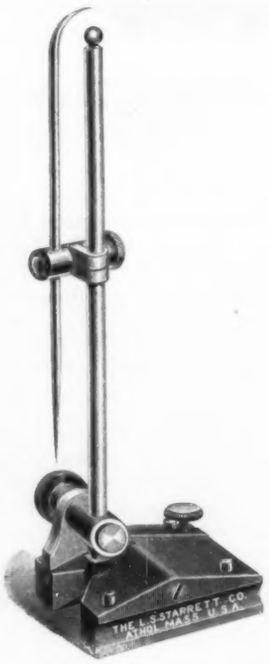
attaching tool is provided for drawing the ends of the long chain together, when the link at one end of the chain is passed over a connecting hook with a safety catch at the other end to prevent the chain coming off in event of a puncture. The grip can be put on and taken off in a comparatively short time, and can be used with equally good results for pneumatic or solid rubber tires. We are advised that the grip has been used by some of the hard-

Fig. 2.—One of the Cross Chains.

est drivers, and has proved satisfactory. The manufacturer claims that the grip cannot injure the tires; that it does not mar the wheels; that it positively prevents slipping or skidding on asphalt pavements, in mud, snow, sand or ice; that it can be rolled into a small package and conveniently carried on board when not in use, and that tires last twice as long because they do not slip.

New Universal Surface Gauge.

The universal surface gauge shown herewith has a heavy case hardened steel base grooved through the bottom and end, adapting it for use on or against circular work as well as flat surfaces. The spindle passes through a rotating head, jointed to a rocking bracket, pivoted in the base, the bracket being adjusted by a knurled screw in one end against a stiff spring in the other. The spindle may be set upright or at an angle, or turned so as to work under the base, and can be sensitively adjusted to any position. The snug and head, carrying the scriber, are made so that when the clamp nut is loosened all may be freely moved to any position, and by friction springs retained in place until a slight turn of the clamp nut holds them firmly. In the base are four gauge pins, frictionally held, which may be pushed to bear against the edge of a surface plate, or in the slot of a planer bed for lineal work. For small work the spindle may be removed and the scriber inserted in a hole provided for it, where it can be sensitively adjusted to advantage on bench work. Special attention is called to the four gauge pins in the corners of the base, which adapt it to be employed as a locomotive guide liner and make it convenient for many uses. An extra long spindle, which may be quickly substituted for the regular one, will be sent with the



New Universal Surface Gauge.

gauge when ordered. The gauge is put on the market by the L. S. Starrett Company, Athol, Mass.

Acme Electric Coffee Mill.

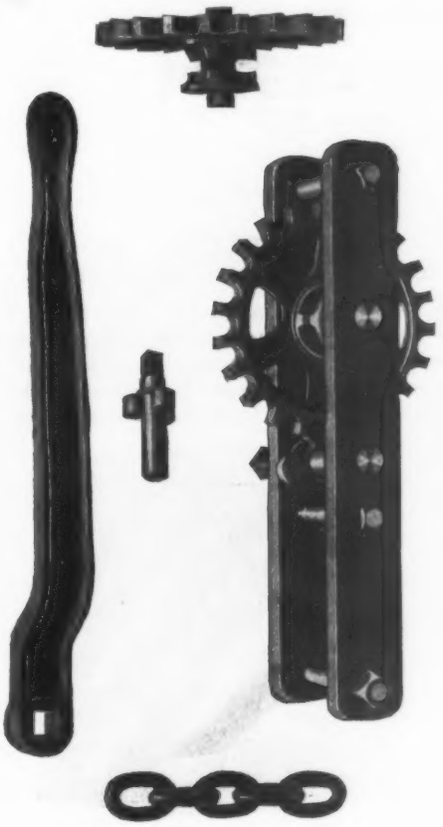
Bartz, Wygant & Brown, Hornellsville, N. Y., have recently put on the market the Acme electric coffee mill, illustrated herewith. The grinders are machined to run absolutely true, and the mill can be regulated to grind coarse or fine while running. It is made for direct cur-

The Acme Electric Coffee Mill.

rent only, from 110 to 220 volts, and can be plugged in any socket. No extra wiring is required. The mill occupies 7 x 18 inches of counter space, but does not require fastening to the counter. It will grind two pounds of coffee per minute, and costs no more to run, it is stated, than one light.

Wilcox Giant Wire Stretcher.

The wire stretcher shown in the accompanying illustration has no dogs or ratchets to be released, while it is self locking, a feature which, it is remarked, is peculiar to the stretcher. It is claimed that a person using the

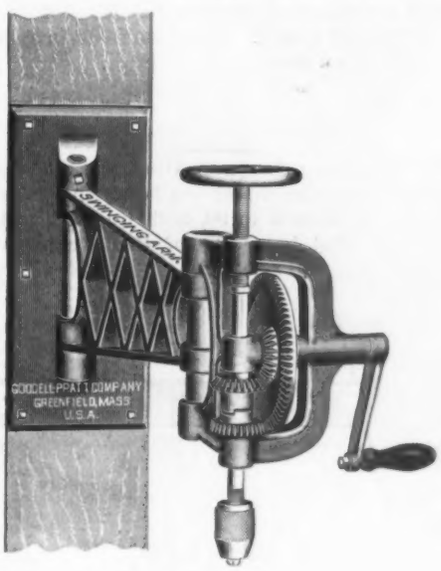


Wilcox Giant Wire Stretcher.

stretcher can exert a tremendous pull with the minimum of exertion; that it has four times the power necessary to stretch any fence. The stretcher is simple mechanically and is put on the market by the Wilcox Mfg. Company, Aurora, Ill.

Bench Drill No. 18.

The deep throat bench drill shown herewith is constructed by attaching a swinging arm, 7⅞ inches wide



Bench Drill No. 18.

and 24 inches long, to a heavy rigid wall plate. Fitted to the end of the arm is the head of the company's regular No. 10 bench drill, with cut gears; three-jawed chuck, having a capacity of 0 to ½ inch, and two speeds, changed by throwing a cam attachment to the shifting rod. The machine will drill to the center of a 54-inch circle, and when not in use may be swung back against the wall out of the way. It can be used above a wide bench to the greatest advantage. A drill, No. 18A, is made the same as the one illustrated, but in addition is provided with an automatic feed. The drills are packed one each in a box, and are put on the market by Goodell-Pratt Company, Greenfield, Mass.

Intercommunicating Telephone Switch.

The Schatz Hardware Company, Chappaqua, N. Y., is manufacturing for the Ericsson Telephone Company,

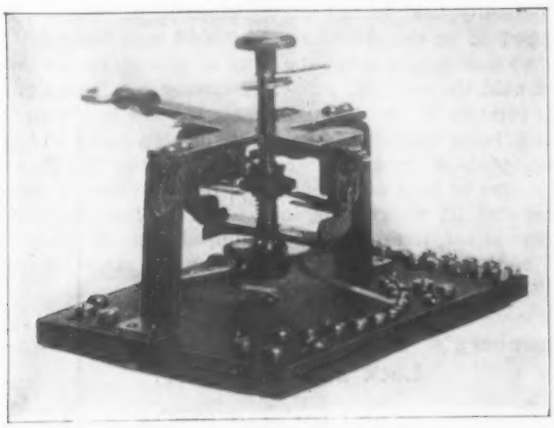


Fig. 1.—Intercommunicating Telephone Switch.

296 Broadway, New York, the intercommunicating telephone switch here shown, which has a capacity of 20 stations. A marked feature of it is that a person at one station can call any other station on the line. In the process of calling the indicator is turned until it points

Fig. 2.—Station in Which Switch is Used.

to the station wanted, when the center button or thumb nut is pressed, which makes the connection and rings bell at the station called. After the communication the receiver is hung on the hook provided, which automatically completes the circuit for other users. This switch is designed for use wherever a private telephone line is used. The entire switch, every part of which is interchangeable, is made of stampings from sheet metal. This company is well equipped to manufacture special shapes and formations of any style or shape, from any kind of sheet metal, for other manufacturers requiring subsidiary parts but who do not care for various reasons fit up to make at their own works. Such parts can be supplied in the rough or any stage of finish.

Opticians' Screw Holder and Driver.

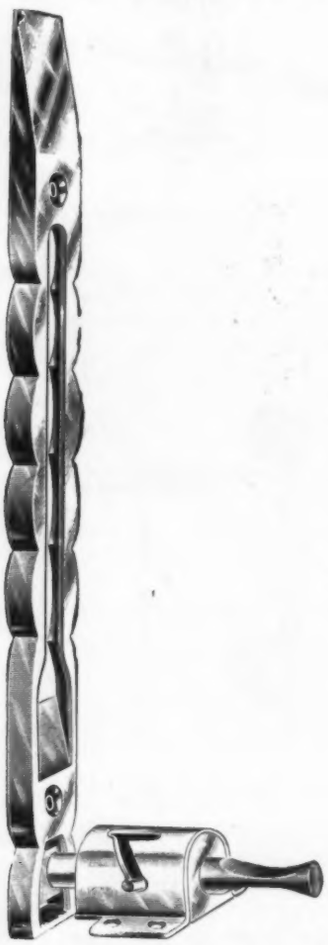
The screw driver shown herewith is designed for those using small screws, especially opticians and watch and clock makers. The body is made of 5-16-inch steel

Opticians' Screw Holder and Driver.

tubing, having a swivel hexagonal head and a chuck to admit of interchangeable blades. The spring fingers are frictionally held to the screw driver blade and may be slipped off or on. Pressing the bowed part between the thumb and fingers opens the jaws to pick up by the head and hold the smallest screw. Drawing the holder back and rotating it the blade will enter the slot in the screw, which, being held to the blade, may be placed and screwed home without danger of dropping or losing it. Screws may also be held and inserted in places where it would otherwise be difficult or impossible. When the screw holder is not needed it may be slipped back on the blade out of the way. The device is put on the market by the L. S. Starrett Company, Athol, Mass.

Rosenberg's Perfection Burglar Proof Sash Lock and Ventilator.

The Safety Window Lock & Ventilator Company, 17-21 Quincy street, Chicago, Ill., has added new features



Rosenberg's Perfection Burglar Proof Sash Lock and Ventilator.

to its sash lock and ventilator, as shown herewith. These permit the sash to be raised from the bottom or lowered from the top from 1 to 6 inches for ventilation without sacrificing security from entrance by burglars, the window being locked at any desired point. The lock draws the sashes together when the window is shut and locks them automatically. It is impossible to reach over the partly open window with the hand, a pronged stick or anything else to unlatch the bolt, it is explained, making the window as burglar proof when open as when shut. No cutting of sash is necessary in attaching the lock, a screw driver being the only tool requisite. The ordinary style of sash lock is unnecessary when the one described is used.

Busse Upholstered Chair Seats.

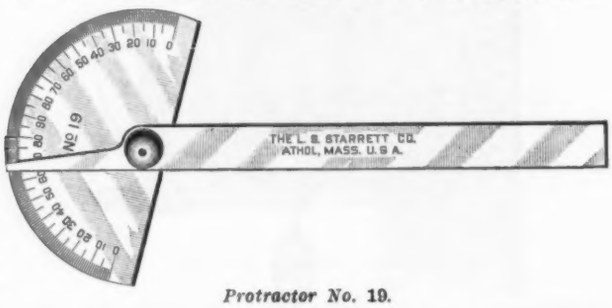
W. A. Busse & Co., 118-126 North May street, Chicago, Ill., for whom Henry Berkele, 29 Murray street, New York, is Eastern representative, have put out several new styles of the Busse patent upholstered chair seat, one of which, known in trade parlance as Local, tufted,

Local, Tufted Upholstered Chair Seat.

is here illustrated. They are intended to replace a worn out cane or cobbler seat and can be put on by the most inexpert in a few minutes by simply swinging four flat steel hooks into position on under side of chair, the hooks being securely riveted to seat at one end of hook, so they will turn readily and elastic enough to permit of being bent to fit different thicknesses of wood frame. These seats are made in Local, plain and tufted, English Cottage, Crown and Ball Top, plain and cobbler (or round) tufted, in 12 to 18 inch sizes. The seats are upholstered with best quality morocco grained leatherette, filled with a soft, elastic fiber and mounted upon a foundation of three-ply veneer. While handsome in appearance, they cost less than recaning a chair.

Protractor No. 19.

The L. S. Starrett Company, Athol, Mass., is placing on the market the protractor shown herewith. It is graduated in degrees from 0 to 90, both ways. The blade is 6 inches long, and by means of the company's patent



Protractor No. 19.

lock joint is set firmly by a slight turn of the nut. The back of the tool is flat. The tool is alluded to as accurate and as convenient for setting bevels, for transferring angles, for use as a small T-square, and for a large number of other uses by machinists, draftsmen or mechanics.

The Wurkeze Portable Force Pump.

The Wurkeze portable force pump shown herewith may be put to a variety of uses and is referred to as being especially valuable in cases where a hose is not feasible. It is supplied with a nozzle and sprayer and may be used for washing windows, spraying flowers, shrubs, trees and lawns, for extinguishing small fires, washing carriages, &c. Among the points of merit claimed for the pump the manufacturer includes the following: That it is all brass, cannot rust, is easy to operate and always ready to work. Likewise, the mechanism

The Wurkeze Portable Force Pump.

does not become disabled, as it is made for durability and the construction is perfect. The pump is made in Nos. 1 and 2, hight 26 inches and diameters of 1 1-16 and 1½ inches, respectively. Two feet of hose is furnished with each pump and the capacity of each is 6 and 12 gallons per minute, according to size. The company also makes the Wurkeze portable bilge pump, very similar, but not illustrated, in the same numbers, having a hight of 16 and 17 inches, same diameters, capacity and price, but with 5 feet of hose. They are offered by the Marine Hardware Company, Peabody, Mass.

Wilcox Wagon Jack.

The Wilcox Mfg. Company, Aurora, Ill., is just placing on the market a new pattern of steel wagon jack, shown herewith. By the use of compound levers in the jack a perpendicular lift is accomplished with the minimum of labor and the load is locked automatically in any position. The jack is made in three sizes, ranging from 900 to 4000 pounds capacity.

Wilcox Wagon Jack.

PAINTS, OILS AND COLORS

White Lead, Zinc, &c.—

	₱ lb
Lead, English white, in Oil	9½@ 9¼
Lead, American white, in Oil:	
Lots of 500 lb or over	@ 6¼
Lots less than 500 lb	@ 7
In Barrels	@ 6
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ½
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	@ 1½
Lead, American. Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.	
	₱ lb
Lead, White, Dry in bbls	@ 6
Zinc, American, dry	4¾@ 4¾
Zinc, French:	
Paris, Red Seal, dry	8½
Paris, Green Seal, dry	9½
Antwerp, Red Seal, dry	7½
Antwerp, Green Seal, dry	8½
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over	11½@12½
Lots of less than 1 ton	12½@12½
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over	10½@11½
Lots of less than 1 ton	10½@11½

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	₱ lb
Black, Carbon	5 @10
Black, Drop, Amer	4 @ 6
Black, Drop, Eng	5 @15
Black, Ivory	16 @20
Lamp, Com	4½@ 6
Blue, Celestial	4 @ 6
Blue, Chinese	29 @32
Blue, Prussian	27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.55@4.00
Green, Chrome, ordinary	3½@ 6
Green, Chrome, pure	17 @25
Lead, Red, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 6½
Lots less than 500 lb	@ 7
Litharge, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 6½
Lots less than 500 lb	@ 7
Ocher, American	₱ ton $8.50@16.00
Orcher, American Golden	2½@ 3½
Orcher, French	1¾@ 2¼
Orcher, Foreign Golden	3 @ 4
Orange Mineral, English	8¾@10½
Orange Mineral, French	10½@11¼
Orange Mineral, German	7¾@10
Orange Mineral, American	8 @ 8¼
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	₱ 100 lb $0.50@1.25
Red Venetian, English	100 lb $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9½
Sienna, Ital., Raw, Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	1½@ 2
Talc, French	₱ ton $20.00@30.00
Talc, American	₱ ton $13.75@25.00
Terra Alba, French	₱ 100 lb 90 @1.00
Terra Alba, English	₱ 100 lb 90 @1.00
Terra Alba, American, ₱ 100 lb., No. 1	.60 @70
Terra Alba, American, ₱ 100 lb., No. 2	.45 @50
Umber, T'key, Bnt. & Pow	2½@ 3½
Umber, Turkey, Raw & Pow	2½@ 3½
Umber, Burnt, Amer	1½@ 2
Umber, Raw, Amer	1½@ 2
Yellow, Chrome	11 @14
Vermilion, American Lead	10 @25
Vermilion, Quicksilver, bulk	@65
Vermilion, Quicksilver, bags	@66
Vermilion, English, Import	75 @80
Vermilion, Chinese	$0.90@1.00

Colors in Oil—

	₱ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	10 @15
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

Miscellaneous—

Barytes, White, Foreign	₱ ton $17.50@19.00
Barytes, Amer. floated	₱ ton 17.00@18.50
Barytes, Crude, No. 1	₱ ton 10.00@11.00
Chalk, in bulk	₱ ton 3.00@ 3.25
Chalk, in bbls	₱ 100 lb @ .35
China Clay, English	₱ ton 11.00@17.00
Cobalt, Oxide	₱ 100 lb 2.50@
Whiting, Common	₱ 100 lb .45@ .48
Whiting, Gilders	₱ 100 lb .55@ .57
Whiting, Ex. Gilders	₱ 100 lb .58@ .60

Putty—

	₱ lb
In bladders	1½@2
In bulk	₱ 100 lb 1.05@1.15
In cans, 1 lb to 5 lb	2¾@4
In cans, 12½ to 25 lb	1¾@2

Spirits Turpentine— ₱ gal.

In Oil bbls	53½@54
In machine bbls	54 @54½

Glue—

	₱ lb
Cabinet	11 @15
Common Bone	6 @ 8
Extra White	18 @24
Foot Stock, White	11 @14
Foot Stock, Brown	7 @10
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	8 @11
Medium White	18 @24

Gum Shellac—

	₱ lb
Bleached Commercial	40 @42
Bone Dried	50 @52
Button	45 @60
Diamond I	56 @..
Fine Orange	48 @52
A. C. Garnet	40 @41
D. C	@1.10
Octagon B	55 @56
T. N	42 @45
V. S. O	60 @..

Animal, Fish and Vegetable Oils—

	₱ gal.
Linseed, City, raw	43 @44
Linseed, City, boiled	45 @46
Linseed, State and West'n, raw	41 @..
Linseed, raw Calcutta seed	@55
Lard, Prime, Winter	56 @58
Lard, Extra No. 1	48 @49
Lard, No. 2	36 @38
Cotton-seed, Crude, f.o.b. mills	16 @17
Cotton-seed, Summer Yellow, Prime	22½@24
Cotton-seed, Summer Yellow, off grades	22 @23½
Sperm, Crude	60 @..
Sperm, Natural Spring	@..
Sperm, Bleached Spring	@..
Sperm, Natural Winter	62 @64
Sperm, Bleached Winter	65 @67
Tallow, Prime	48 @50
Whale, Crude	@..
Whale, Natural Winter	45 @..
Whale, Bleached Winter	47 @..
Menhaden, Brown, Strained	27 @28
Menhaden, Light, Strained	28 @29
Menhaden, Bleached Winter	30 @32
Menhaden, Ex-Bld. Winter	32 @33
Menhaden, Southern	19½@20
Cocoanut, Ceylon	₱ lb 6½@ 6¾
Cocoanut, Cochin	₱ lb 7¼@ 7½
Cod, Domestic, Prime	36 @38
Cod, Newfoundland	39 @41
Red Elaine	31 @33
Red Saponified	₱ lb 4¾@ 5
Olive, Italian, bbls	53 @56
Neatsfoot, prime	50 @51
Palm, prime Logos	₱ lb 5¾@ 6

Mineral Oils—

	₱ gal.
Black, 29 gravity, 25@30 cold test	10½@11½
Black, 29 gravity, 15 cold test	11½@12½
Black, Summer	10½@11½
Cylinder, light filtered	18 @19
Cylinder, dark filtered	16 @17
Paraffine, 903-907 gravity	12½@13
Paraffine, 903 gravity	11½@12
Paraffine, 883 gravity	9¼@ 9½
Pariffine, Red	11½@13

In small lots ⅛¢ advance

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Domestic, ℔ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anvils—American—
Eagle Anvils.....℔ lb 7¼@7¾¢
Hay-Budden, Wrought.....9@9¾¢
Horseshoe brand, Wrought.....9@9¾¢
Trenton .....℔ lb 9@9¾¢

Imported—
Peter Wright & Sons.....℔ lb 10½¢

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Hull Bros. Co.....30&10%
Livingston Nail Co.....33⅓%

Augers and Bits—
Com. Double Spur....75@75&10%
Boring Mach. Augers.70&10@75%
Car Bits, 12-in. twist..60@60&10%
Jennings' Pattern..60&10&10@70%
Ford's Auger and Car Bits.....40&5%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50&7½&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits.....40&10%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist....60&10%
Wright's Jennings' Bits (R. Jennings' list) 50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ℔ doz. $26; No. 2, $18.....50&10%
Ford's, Clark's Pattern.....50&10@60%
C. E. Jennings & Co., Steer's Pat..25%
Swan's 60%

Gimlet Bits—
Common Dble. Cut..gro.$3.00@3.25
German Pattern....gro.$4.50@4.75

Hollow Augers—
Bonney Pat., per doz.,$9.00@10.00
Ames .....25&10%
New Patent.....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—
Ford's 40%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....35&5%
Ohio Tool Co.'s.....40%
Snell's 40%

Awl Hafts— See *Hafts, Awl.*

Awls—
Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro.63¢@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00
Hurwood 40%

Awl and Tool Sets— See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights. (up to 3½ lb.)
First Quality.....$6.50
Second Quality.....$5.75
NOTE.—Heavier Weights add Extras as per regular schedule.

Axle Grease— See *Grease, Axle*

Axles— *Iron or Steel*
Concord, Loose Collar...4¼@4¾¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...3¼@3¾¢
No. 1½ Com., New Style3¾@4¼¢
No. 2 Solid Collar.....4@4½¢
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18.....75&10@75&10&5%
Nos. 19 to 22.....75&10@75&10&5%

Boxes, Axle—
Common and Concord, not turned lb., 5¼@5¾¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb. 8½@9¢

Bait— Fishing—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—
Caldwell new list.....50%
Pullman .....50&10@60%

Spring—
Spring Balances.....60@60&5%
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—
Steel Crowbars, 10 to 40 lb.... per lb. 2½@2¾¢

Towel -
No. 10 Ideal, Nickel Plate..℔ gro. $8.50

Beams, Scale—
Scale Beams.....40&10@50%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.85; Tinned.....$1.00
No. 11 Wire Coppered ℔ doz. $1.10; Tinned.....$1.20
No. 10 Wire Galvanized..℔ doz. $1.75
Western W. G. Co.:
No. 1 Electric.....℔ gro. $7.80
No. 2 Buffalo.....℔ gro. $9.00
No. 3 Perfection Dust.....℔ gro. $8.00

Egg—
Holt-Lyon Co.:
Holt, No. A, Japanned....℔ doz. $1.20
Holt, No. 1, Tinned.....℔ doz. $1.50
Holt, No. B, Japanned....℔ doz. $2.00
Holt, No. 2, Tinned.....℔ doz. $2.25
Lyon, No. 2, Japanned....℔ doz. $1.25
Lyon, No. 3, Japanned....℔ doz. $1.50
Taplin Mfg. Co.: ℔ gro.
No. 60 Improved Dover.....$6.00
No. 75 Improved Dover.....$6.50
No. 100 Improved Dover.....$7.00
No. 102 Improved Dover, Tin'd..$8.50
No. 150 Improved Dover, Hotel..$15.00
No. 152 Imp'd Dover, Hotel, T'd.$17.00
No. 200 Imp'd Dover Tumbler....$8.50
No. 202 Imp'd Dover Tumbler, T'd.$9.50
No. 300 Imp'd Dover Mammoth, ℔ doz. $25.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (S. S. & Co.).℔ gro. net, $6.00

Bellows—
Blacksmith, Standard List.. 60&10@70&10%

Blacksmiths'—
Net Prices.

Inch..	30	32	34	36	38	40
Each.	$3.25	3.50	4.00	4.50	5.00	5.75

Extra Length:

Each.	$3.75	4.25	4.75	5.25	6.00	7.00

Hand—

Inch...	6	7	8	9	10
Doz...	$4.50	5.00	5.50	6.00	6.50

Hand—

Inch.	9	10	11	12	14
Doz.	$8.00	9.00	10.50	12.50	14.50

Bells— Cow—
Ordinary goods...75&5@75&10&5%
High grade.....70&10@70&10@5%
Jersey .....75&10%
Texas Star.....50%

Door—
Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....60&10&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

Hand—
Hand Bells, Polished, Brass.. 60&5@60&10&5%
White Metal.....60%
Nickel Plated....50&10@50&10&5%
Swiss .....60@60&7½%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....33⅓@35%

Miscellaneous—
Farm Bells.....lb. 2¼¢
Steel Alloy Church and School 50&10&5@60&5%
American Tube & Stamping Co. Gongs 75%
Table Call Bells.....50@50&10%

Belting— Leather—
Extra Hvy, Short Lap..60@60&5%
Regular Short Lap...65&10@70%
Standard .....70&5@70&10%
Light Standard.....70&10@75%
Cut Leather Lacing.....60&10%
Leather Lacing Sides, per sq. ft. 17½@18¢

Rubber—
Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....65&70%
Extra .....60&5@60&10%
High Grade.....50&5@50&10%

Bench Stops— See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender.....40%
Green River Tire Benders and Upsetters 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

Bicycle Goods—
John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—
Common Wooden....70&10@75&5%
Hartz St. Tackle Blocks.....50@50&5%
Hollow Steel Blocks, with Ford's Patent Sheaves.....50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron....50&10%
Stowell's Self Loading.....60%
See also Machines, Hoisting.

Boards, Stove—
Zinc, Crystal, &c...30&10@40&10%

Boards, Wash— See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co.....33⅓%

Bolts— Carriage, Machine, &c.—
Common Carriage (cut thread): ⅜ x 6 and Smaller.....75&5% Larger and Longer.....70&5%
Phila. Eagle,$3.00 list May 2½,'99 80&10%
Bolt Ends, list Feb.1½,'95.75@75&5%
Machine, ⅜ x 4 and smaller 75&7½%
Machine, larger and longer.. 70&7½%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:

Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz.	*$0.30*	*.35*	*.45*	*.56*	*.75*

Cast Iron Spring Foot, Jap'd:

Inch.....	*6*	*8*	*10*
Per doz.....	*$1.15*	*1.40*	*2.00*

Cast Iron Chain, Flat, Japanned:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.95*	*1.25*	*1.55*

Cast Iron Shutter, Japanned, Brass Knobs:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.80*	*.90*	*1.20*

Wrt Barrel Japd.....80@80&10%
Wrt " Bronzed....50@50&10%
Wrt. Spring...70&10@70&10&10%
Wrt. Shutter.....50&5@50&10&5%
Wrt. Square Neck.....75@75&10%
Wrt Square.66⅔&10@66⅔&10&10%
Ives' Patent Door.....60%

Stove and Plow—
Plow .....70&10@70&10&5%
Stove .....82½@82½&5%

Tire—
Common 72½%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....72½%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....72½%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—
Borers Tap, Ring, with Handle:

Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz...	*$4.80*	*5.60*	*6.40*	*8.00*
Inch			*2¼*	*2½*
Per doz			*$8.65*	*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.....25%

Boxes, Mitre—
C. E. Jennings & Co.....30%
Langdon .....15&10%
Perfection .....℔ doz. $30.00
Schatz 40%

Braces—
Common Ball, American.$1.15@1.25
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat..50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60&10@65%

Brackets—
Wrought Steel...80&10@80&10&5%
Bradley's Wire Shelf:
Full cases.....80&10&10%
Broken cases.....80&10%
Griffin's Pressed Steel.....80%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods— See *Wire and Wire Goods.*

Broilers—
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—
Price per dozen.

Quart.....	*10*	*12*	*14*
Water, Regular...	*1.40*	*1.70*	*1.90*
Water, Heavy....	*3.40*	*3.70*	*3.80*
Fire, Rd. Bottom..	*2.30*	*2.55*	*2.95*
Well	*2.55*	*2.87*	*3.15*

Bucks, Saw—
Hoosier.....℔ gro. $36.00

Bull Rings—See *Rings, Bull*

Butts— Brass—
Wrought, list Sept., '96.....30%
Cast Brass, Tiebout's.....50%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow....40&10@50%
Loose Joint.....70&5@75%
Loose Pin.....70&5@75%
Mayer's Hinges.....70&5@75%
Parliament Butts.....70&5@75%

Wrought Steel—
Table and Back Flaps...75%
Narrow and Broad.....75%
Inside Blind.....75&10%
Loose Pin.....75%
Loose Pin, Ball and Steeple Tip .....80&20%
Japanned Ball Tip Butts... 70&10%
Bronzed, Wrt., Nar. and Inside Blind Butts....55&10%

Extra 5 or 4 ins.

Cages, Bird—
Hendryx Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb.4¢@4¼¢
Sharp, 1 prong...per lb., 4½¢@4¾¢
Gautier, Blunt.....4¢@4¼¢
Gautier, Sharp.....4½¢@4¾¢
Perkins', Blunt Toe.....₱ lb 3.65¢
Perkins', Sharp Toe.....₱ lb 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$48.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M.20&5%
B. L. Caps (Sturtevant Shells) $2 per M.....20%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd.$1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
7.40	5.10	4.15	3.45	3.30	3.20	3.15

⅝ ¾ ⅞ 1 to 1¼ inch.
3.10 3.00 2.95 2.95 per 100 lb.
German Coil.....60&10&10@70%

Halters and Ties—

Halter Chains...60&10@60&10&10%
German Pattern Halter Chains, list July 24, '97.....60&10&10%
Cow Ties.....60@60&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring.$23.50
6½—6-2, Str'ght, with ring.$24.50
6½—8-2, Str'ght, with ring.$28.00
6½—10-2, Str'ght, with ring.$32.00
NOTE.—Add 2c per pair for Hooks. Twist Traces 2c per pair higher than Straight Link.
Trace, Wagon and Fancy Chains.....60&5@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10@60&10&5%
Brass.....60&10@60&10&10%
Safety Chain.....75@75&10&5%
Gal. Pump Chain.....lb. 5@5¼%
Covert Mfg. Co.:
Breast.....40&2%
Halter.....40&2%
Heel.....40&2%
Rein.....40&2%
Stallion.....40&2%
Covert Sad. Works:
Breast.....70%
Halter.....70%
Hold Back.....70%
Rein.....70%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Eureka Coil and Halter....45@50&5%
Niagara Coil and Halter....45@50&5%
Niagara Cow Ties....45&5@50&10&5%
Niagara Wire Dog Chains..45@50&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chalk—(From Jobbers.)

Carpenters' Blue.....gro. 35@38¢
Carpenters' Red.....gro. 30@33¢
Carpenters' White....gro. 25@28¢
See also Crayons.

Checks, Door—

Bardsley's.....45%
Columbia.....50&10%
Eclipse.....60&10%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters', etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—Socket Framing and Firmer

Standard List.....70&10@75&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60%
C. E. Jennings & Co. Socket Framing No. 15.....60%
Ohio Tool Co.'s.....70%
Swan's.....70%
L. & I. J. White.....30@30&5%

Tanged—

Tanged Firmers....40&5@40&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White, Tanged.....25&5%

Cold—

	lb.
Cold Chisels, good quality	*.13@15¢*
Cold Chisels, fair quality	*.11@12¢*
Cold Chisels, ordinary	*... 9@10¢*

Chucks—

Beach Pat., each $8.00.....35&5%
Pratt's Positive Drive.....25%
Empire.....25%
Blacksmiths'.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....50%
Universal.....50%
Combination.....50%
Drill Chucks, New Model.....30%
Drill Chucks, Standard.....40%
Drill Chucks, Skinner Pat., 0, 1, 2.40%
Drill Chucks, Skinner Pat., 3, 4, 5, 6, 7, 8.....30%
Drill Chucks, Positive Drive.....30%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination.....50%
Czar Drill.....35%
Combination Geared Scroll.....40%
Geared Scroll.....40%
Independent.....50%
Independent Steel.....40%
Union Drill.....45%
Universal.....50%
Independent Iron F. Plate Jaws.40%
Independent Steel F. Plate Jaws.40%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P. S. & W. Co..50%
Carriage Makers', Sargent's.....60%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..₱ doz. $4.05 net
Star Shank, All Steel..₱ doz. $3.24 net
W. & C. Shank, All Steel, ₱ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....33⅓@33⅓&10%
L. & I. J. White.....30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse.....$8.75 } 15%
1902 Chicago Horse.....$10.75 }
20th Century Horse, each, $5.00...20%
Lightning Belt.....$15.00 } 15%
Chicago Belt.....$20.00 }
Stewart's Patent Sheep, $12.75....20%

Finger Nail Clippers—

Smith & Hemenway Co.₱ doz. net $2.00

Clips, Axle—

Eagle, 5-16 and ⅜ in..75@75&10%
Norway, 5-16 and ⅜ in..60&10@70%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list: Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.....70&10@75%

Coffee Mills—
See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Mane and Tail—

Covert's Saddlery Works.....60&10%

Compasses, Dividers, &c.

Ordinary Goods.....75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory.	*Nested.*	*Not nested.*
A Eastern	*.75&5%*	*75%*
B. Eastern	*.75&10%*	*75&5%*
Central	*.75&5%*	*70&10&5%*
Southern	*.70&7½%*	*70&2½%*
S. Western	*.70&5%*	*70%*

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal., each..	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	6	8	
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galv. Lined, ea.	$1.85	$2.00	$2.25	$2.90	$3.90

25%

Gavl. Lined, side handles.

Gal.	2	3	4	6	8
Each.	$1.95	$2.15	$2.40	$3.30	$4.15..25%

Coopers' Tools—
See *Tools, Coopers'.*

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com..lb.22@23½¢
Cable Laid Italian..... lb., A, 18¢; B, 16¢
*Common India.....*lb. *10@10½¢*
Cotton Sash Cord, Tw'ted..11@17¢
Patent Russia.....lb. ..@14¢
Cable Laid Russia....lb. ..@15¢
India Hemp, Braided..lb. ..@18¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted.lb. 12@13¢
Anniston Cordage Co.: Braided Cotton, Old Glory, Nos. 7 to 12....₱ lb 28 ¢
Anniston, Nos. 7 to 12....₱ lb 22 ¢
Old Colony, Nos. 7 to 12..₱ lb 22 ¢
Anniston Drab, Nos. 7 to 12.₱ lb 26 ¢
Pearl Braided, cotton, No. 6, ₱ lb. 23½¢; No. 7, 22½¢; Nos. 8 to 12, 22¢.
Eddystone Braided, Nos. 7, 8, 9 and 10.....₱ lb 24 ¢
Eddystone Braided Cotton, No. 6..₱ lb 25 ¢
Harmony Cable Laid Italian, Nos. 7 to 10.....₱ lb 23 ¢
Peerless:
Cable Laid Italian.....16 ¢
Cable Laid Russian.....14 ¢
Cable Laid India.....12 ¢
Braided India.....18 ¢
Samson, Nos. 8 to 12:
Braided, Drab Cotton.....₱ lb 40 ¢
Braided, Italian Hamp....₱ lb 40 ¢
Braided, Linen.....₱ lb 55 ¢
Braided, White Cotton or Spot..₱ lb 35 ¢
Massachusetts, White.....₱ lb 28 ¢
Massachusetts, Drab.....₱ lb 32 ¢
Phoenix, White, Nos. 8 to 12, 24¢; No. 7, 21½¢; No. 6, 25½¢.
Silver Lake:
A quality, Drab.....40 ¢
A quality, White.....35 ¢
B quality, Drab.....35 ¢
B quality, White.....30 ¢
Italian Hemp.....40 ¢
Linen.....57½ ¢

Wire, Picture—

List Oct., '00.....
85&10&10@85&10&10&5%
Hendryx Standard Wire Picture Cord, 85&10&5%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, gr. 5½@6¢ Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.:
Jumbo Crayons.....gr. $3.50
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square.....gr. $1.50
Rolling Mill Crayons.....gr. $2.50
Railroad Crayons (composition) gr. $2.00
Case lots, 20%
Zelnicker's Lumber:
Red, Blue, Green.....₱ gro. $6.50
Black.....₱ gro. $4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, Heavy.....₱ doz. $7.00
Fort Madison, Light.....₱ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847.₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....₱ doz. $3.00
Wm. Rogers & Son.....₱ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise.....25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's.....₱ doz. 30&10@40%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40&10@50%
Little Giant.....₱ doz. 33⅓@40%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....40%
New Triumph No. 605, ₱ doz. $24.00..30&10@40%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....₱ doz. 30&10@40%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 24 x 7, 26 x 8, 30 x 9.....55%
Kraut Cutters, 36 x 12, 40 x 12....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₱ doz. $3.00
Combined Slaw Cutter and Corn Grater.....₱ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..₱ gr. $18@$20
Slaw Cutters, 2 Knife..₱ gr. $22@$30

Tobacco—

All Iron, Cheap..doz. $4.25@$4.50
Enterprise.....25@30%
National, ₱ doz., No. 1, $21; No. 2, $18.....40%
Sargent's, ₱ doz., No. 2.....60%
Sargent's, Nos. 12 and 21.....60&10%

Washer—

Appleton's, ₱ doz., $16.00....50&10&10%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger..per doz., $9.00
Iwan's Imp'ved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers.....₱ doz. $6.25
Iwan's Perfection Post Hole Digger..₱ doz. $8.25
Iwan's Split Handle Post Hole Diggers.....₱ doz. $7.25
Kohler's Universal.....₱ doz. $15.00
Kohler's Little Giant.....₱ doz. $12.00
Kohler's Hercules.....₱ doz. $10.00
Kohler's Invincible.....₱ doz. $9.00
Kohler's Rival.....₱ doz. $8.00
Kohler's Pioneer.....₱ doz. $7.20
Never-Break Post Hole Diggers, ₱ doz., $24.00.....60%
Samson, ₱ doz. $34.00.....25%

Dividers—See *Compasses.*

Doors, Screen—

Phillips', style E, ⅞ in....₱ doz. $10.50
Phillips', style 077, ⅞ in....₱ doz. $8.00
Phillips', style x-y, ⅞ in....₱ doz. $11.00

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₱ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill, each.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P. S. & W.....40&5%
Goodell Automatic Drills..40&5@40&10&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....33⅓%
Ratchet, Whitney's, P. S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10@60&10&10%
Taper and Straight Shank.... 60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@60¢
Balsey's Screw Holder and Driver, ₱ doz., 2½-in., $6; 4-in., $7.50; 6-in., $9.....40%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21....25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Never Turn.....60%
New England Specialty Co.....50%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 50 and 55.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles..60@60&10&10%
No. 86.....70@70&10&10%
Swan's:
Nos. 65 to 68.....50%
No. 40.....40&10%
Nos. 25, 35 and 45.....20&10&10%

Eave Trough, Galvanized—

Territory.	*L. C. L.*
A, Eastern	*.80&7½%*
B, Eastern	*.80&12½%*
Central	*.80&7½%*
Southern	*.70&20&10%*
S. Western	*.75&12½%*

Terms.—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments:
Plate Rd., and Rd., Cor., 2, 3 and 4 in.....75%
Plate Rd., and Rd., Cor., 5 and 6 in.....60%
Perfect Elbows (S., S. & Co.).....40%

Emery, Turkish—

	4 to 6	*5 4 to 150*	*Flour*
Kegs	*.lb. 5 ¢*	*5½ ¢*	*3½ ¢*
½ Kegs	*.lb. 5¼ ¢*	*5¾ ¢*	*3¾ ¢*
Kegs	*.lb. 5 ¢*	*6 ¢*	
10-lb. cans, 10 in case	*.6½ ¢*	*7 ¢*	*6 ¢*
10-lb. cans, less than 10	*.10 ¢*	*10 ¢*	*8 ¢*

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's.....50&10%
Walling's.....45%

Cord and Weight—

Ives.....40%

Faucets—

Cork Lined.....50@50&10%
Metallic Key, Leather Lined..60&10@60&10&5%
Red Cedar.....40@40&10%
Petroleum.....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star.....60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined..50%
John Sommer's Reliable Cork Lined..50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined..50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ⅝ and ¾ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—

See *Plates, Felloe.*

Files— Domestic—

List revised Nov. 1, 1899.
Best Brands.....70&10@75&5%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—

Stubs' Tapers, Stubs' list, July 2¼, '97.....30%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103.....$4.00
Special, No. 104.....$4.00
Fusible Links.....$0.25
Expansion Bolts.....50&10%

Grindstone—

Net Prices:

Inch	15	17	19	21	24
Per doz.	$2.15	2.85	3.25	3.75	4.50

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's.....70%
Stowell's Giant Grindstone Hanger..℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy.....50&10&10%
Stowell's Grindstone Fixtures, Light..60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

Base Discounts Aug. 1, 1899, list:
Hay, 2 tine.....50&10&5%
Boys' & Fish, 2 tine.50&10&5%
Hay & Boys', 3 tine....60&5%
Hay & Boys', 4 tine....66⅔%
Champion Hay.....66⅔%
Hay & Header, long 3 tine.65%
Header, 4 tine.....65%
Barley 4 & 5 tine, Steel..60&20%
Manure, 4 tine.....60&15&2½%
Manure, 5 & 6 tine..66⅔&2½%
Spading.....70&2½%
Potato Digger, 6 tine....60&10%
Sugar Beet.....40&10%
Coke & Coal.....40&10%
Heavy Mill & Street.....65%
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	1	2	3	4	6
Each	$1.25	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp.....$2.75
Cotton.....3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
} Add ½¢ per ft.

Gates, Molasses and Oil—

Stebbins' Pattern.80&10@80&10&5%

Gauges—

Marking, Mortise, &c.....50&10&5@50&10&10&5%
Chapin-Stephens Co.:
Marking, Mortise, &c.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....20@20&10&10%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....30&10%

Gimlets— Single Cut—

Nail, Metal, Asst., gro..*$1.40@1.50*
Spike, Metal, Asst., gro.*$2.80@3.50*
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted, gro. $4.25@4.50

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co.....60@60&10&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush..25@50%
Cans (½ pts., pts., qts., ½ gal., gal.).....25@48%
International Glue Co. (Martin's)...40&10%

Grease, Axle—

Common Grade....*gro. $4.50@5.50*
Dixon's Everlasting..10-lb pails, ea. 85¢
Dixon's Everlasting, in boxes, ℔ doz. 1 lb, $1.20; 2 lb, $2.00

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ℔ doz.....$2.00 } 33⅓%
Pike Mower and Tool Grinder, each.....$6.00 }
Velox Ball Bearing, Mounted, Angle Iron Frames, each.....$3.25

Halters and Ties—

Covert Mfg. Co.:
Web.....45%
Jute Rope.....50&5%
Sisal Rope.....35&5%
Cotton Rope.....45&2%
Hemp Rope.....45&2%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters.....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties.70%
Sisal Rope Ties.....60&10%

Hammers—

Handled Hammers—

Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....40@40&10&10%
Peck, Stow & Wilcox.....40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail.....33⅓&7⅛@33⅓&10&7⅛%
Engineers' and B. S. Hand.....50&7⅛&5@50&10&7⅛&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....40&2½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—

Under 3 lb., per lb. 50¢.....80&10&10@85%
3 to 5 lb., per lb. 40¢.....80&10&10@85%
Over 5 lb., per lb 30¢..85@85&10%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c.....60@60&10%
Hoe, Rake, &c.....45@50&5%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50&5%
D Handles.....40%

Cross-Cut Saw Handles—

Atkins'.....40&5%
Champion.....45@45&10%
Disston's.....50%

Mechanics' Tool Handles—

Auger, assorted...*gro. $2.50@2.85*
Brad Awl.....*gro. $1.65@1.85*
Chisel Handles:
Apple Tanged Firmer, gro. assorted.....*$2.40@$2.65*
Hickory Tanged Firmer, gro. assorted.....*$2.15@$2.40*
Apple Socket Firmer, gro. assorted.....*$1.75@$1.95*
Hickory Socket Firmer, gro. assorted.....*$1.45@$1.60*
Hickory Socket Framing, gro. assorted.....*$1.60@$1.75*
File, assorted.....gro. *$1.30@$1.40*
Hammer, Hatchet, Axe, &c. 60&10@60&10&10%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel.....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle....℔ gro. $0.85@$1.50

Hangers—

NOTE—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c
Barn Door, New Pattern, Round Groove, Regular:

Inch	3	4	5	6	8
Single Doz.	$0.90	1.25	1.60	1.95	2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch	3	4	5	6
Single Doz.	$1.30	1.85	2.50	3.00

Allith Mfg. Co.:
Reliable, No. 1.....per doz. $8.00
Reliable, No. 2.....per doz. $9.60
Chicago Spring Butt Co.:
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....30%
Railroad.....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10&5%
Roller Bearing.....70&5%
Griffin Mfg. Co.:
Solid Axle, No. 19, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.00
Parlor, Standard.....$3.15
Parlor, No. 105.....$2.85
Parlor, New Model.....$2.80
Parlor, New Champion.....$2.25
Barn Door, Standard.60&10&2½%
Hinged.....net $6.40
Covered.....60&10%
Special.....70&5%
Lawrence Bros.:
Advance.....60&10%
Cleveland.....70&5%
Clipper, No. 75.....60%
Crown.....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant.....60&5%
Hummer.....70&5%
New York.....60&10%
Peerless.....70&5%
Sterling.....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60%
Richards Mfg. Co.:
Pioneer Wood Track No. 3..$2.15
Ball B'r'g St'l Track No. 10.$2.40
Roller B'r'g St'l Track No. 12.$2.30
Ball B'r'g St'l Track No. 13.$2.40
Roller B'r'g St'l Track No. 14.$2.30
Hero, Adj. Track No. 19....50%
Adjustable Track Tandem Trolley Track No. 110.....50%
Seal Steel Track No. 8.....$2.40
Auto Adj. Track No. 22..40&10%
Trolley B. D. No. 17.....$1.40
Trolley F. D. No. 120.....$2.35
Trolley F. D. No. 121.....$2.45
Trolley F. D. No. 150.....$2.60
Safety Underwriters F. D. No. 101.....$2.25
Tandem No. 44.....70&5%
Trolley F. D. No. 151.....$3.00
Palace, Adjustable Track No. 132.....40&10%
Royal, Adjustable Track No. 122.....40&10%
Ives' Wood Track No. 1.....$2.15
Trolley B. D. No. 20.....$1.35
Trolley F. D. No. 24.....$1.45
Trolley B. D. No. 27.....$1.50
Trolley B. D. No. 28.....$1.66
Roller Bearings Nos. 39, 40, 41, 43, 44.....70&5%
Anti-friction No. 42.....60&10%
Hinged Tandem No. 48.....60%
Folding Door B. B. Swivel No. 135.....30%
Safety Door Hanger Co.:
Storm King Safety.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas.....60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator.....40%
Express.....50%
Freight Car Door.....60%
Interstate.....60&10%
Lundy Parlor Door.....50&10%
Magic.....60%
Matchless.....60&10%
Nansen.....70&5%
Parlor Door.....50&10%
Railroad.....50&10%
Rex Hinge Door.....60%
Street Car Door.....50%
Steel, Nos. 300, 404, 500....50&10%
Underwriters' Fire Door.....40%
Wild West Warehouse Door....50%
Zepith for Wood Track..50&10%
A. L. Sweet Iron Works:
Check Back.....70%
Climax Anti-Friction.....50&10%
Eagle.....70%
Hylo Hinge.....60%
New Perfection.....60%
Pilot.....60%
Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing.....60&10%
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40%
Ives, Wood Track.....60&10%
L. T. Roller Bearing...60&10&5%
New Era Roller Bearing..50&10%
O. K. Roller Bearing..60&10&5%
Prindle, Wood Track.....60%
Richards' Wood Track.....60%
Richards' Steel Track.....50&10%
Spencer Roller Bearing....60&10%
Tandem, Nos. 1 and 2.....60%
Underwriters' Roller Bearing..40%
Velvet.....50%
Wilcox Auditorium Ball B'r'g.20%
Wilcox Barn Trolley No. 123..40%
Wilcox Elv. Door, Nos. 112 and 122½.....50%
Wilcox Elv. Door, No. 132....40%
Wilcox Fire Trolley, Roller Bearing.....30%
Wilcox Le Roy Noiseless Ball Bearing.....40%
Wilcox New Century..50&10&10%
Wilcox O. K. Steel Track....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing..40%
Wilcox Wideman Narrow Gauge Ball Bearing.....40%
For Track, see Rail.

Extra 5@10% often given.

Hangers— Garment—

Pullman Trouser, No. 1....℔ gro. $9.00
Pullman Trouser, No. 4....℔ gro. $24.00
Victor Folding.....℔ gro. $9.60
Western, W. G. Co.....70&10%

Gate—

Myers' Patent Gate Hangers, ℔ doz. net.....$4.50

Hasps—

McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—

Regular list, first quality..40@..%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—

Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....15%
Clark Coal, ℔ doz. $0.75.....10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	1	3	5
Doz. pair	$0.75	1.35	2.70

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	1	1½	2	2½
Doz. pair	$0.70	.65	.60	.55

Mortise Reversible Shutter (Buffalo, &c.):

No.	1	1½	2
Doz. pair	$0.70	.65	.60

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Parker.....70@75%
Reading's Gravity.....60%
Sargent's, Nos. 1, 3, 5, 11 and 13..75%
Stanley's Steel Gravity Blind Hinges, ℔ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60 to 65, 75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5....75&10&5%
Tip Pat'n, Nos. 1, 3 & 5...75&10&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with L't'es.	$2.00	2.70	5.00
Hinges only.....	1.40	2.05	3.80
Latches only.....	.70	.70	.35

New England:
With Latch.....*doz.*....*@$2.00*
Without Latch...*doz.*....*@$1.60*
Reversible Self-Closing:
With Latch.....*doz.*....*@$1.75*
Without Latch...*doz.*....*@$1.35*
Western:
With Latch.....*doz. $1.75*
Without Latch.....*doz. $1.15*
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches.	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges—

Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

Spring Hinges—

Holdback Cast Iron.....*gro. $9.00@$9.50*
Non-Holdback, Cast Iron.....*gro. $8.00@$8.50*
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor Hinges.....40%
Bommer Spring Hinges.....40%
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor Hinge.....50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American.....30%
Columbia, No. 14.....℔ gr. $9.00
Columbia, No. 18.....℔ gr. $25.00
Columbia, Adjustable, No. 7, ℔ gr. $12.00
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.50
Oxford, new list.....30%
Lawson Mfg. Co. Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges.....40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....$9.00
Chief Ball B'r'g Floor Hinge.50%
Ohio Detachable Screen Door Hinge.....℔ gr. $12.00
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea No. 1.....℔ gr. $9.00
New Idea, Double Acting....45%
New Idea Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb'k.℔ gro. pr.$9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 20, 1904:

Light Strap Hinges ..70%
H'vy Strap H'g's ...75&5%
Light T Hinges 65%
Heavy T Hinges 60%
Extra H'y T H'g's.70&10%
Hinge Hasps 50%
Cor. Heavy Strap..75&5%
Cor. Ex. Heavy T.70&10%

Extra 10@10&10%

Screw Hook and Strap.
- *6 to 12 in.* ..lb. 3¼ ¢
- *1½ to 20 in.* ..lb. 3 ¢
- *22 to 36 in.* ..lb. 2¾ ¢

Screw Hook and Eye:
- *¾ to 1 inch* .....lb. 6 ¢
- *⅝ inch* .....lb. 7 ¢
- *½ inch* .....lb. 9 ¢

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers....35%

Hods— Coal—

	Per doz.
Inch	15 16 17 18
Gals. Open	$2.50 2.75 3.00 3.25
Jap. Open	$1.90 2.10 2.25 2.55
Gals. Funnel	$3.00 3.30 3.60 3.90
Jap. Funnel	$2.45 2.65 2.85 3.30

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar.....each $1.45
Steel Brick.....each $1.10

Hoes— Eye—

Scovil and Oval Pattern ..... 60&10@60&10&10%
Grub, list Feb. 23, 1899 ..... 70&10@75&10%
D. & H. Scovil.....35%

Handled—

August 1, 1899, list.

Field and Garden .....70&10%
Smith's Patent 50%
Meadow & Rhode Island..75%
Black Diamond .....70&10%
Mortar and Street...70&10&10%
Planters' .....75&12½%
Cotton .....70&10&10%
Cotton Chopper.....75&12½%
Weeding Hoes.....66⅔&15%
Steel Weeders.....66⅔&15%
Malleable Weeders....66⅔&15%
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ℔ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....℔ doz. 66⅔%
Junior Size.....℔ doz. $4.00
Ft. Madison Sprouting Hoe..℔ doz. 50%
Ft. Madison Dixie Tobacco Hoe..... 75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....℔ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ℔doz.$4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ℔ doz. $24.00.....45&10%

Door—

Empire 50%
Bardsley's 45%

File and Tool—

Nicholson File Holders and File Handles .....33⅓&40%

Hooks—Cast Iron—

Bird Cage, Reading.....60%
Bird Cage, Sargent's List.....60&10%
Ceiling, Sargent's List.....50&10&10%
Clothes Line, Reading List.....60&10%
Clothes Line, Sargent's List.50&20&10%
Coat and Hat, Sargent's List...50&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....66⅔%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—

Bell .....80&10@..%
Wire C. & H. Hooks: ..... 75&10@75&10&5%
Atlas, Coat and Hat:
Single Cases.....75%
10 Case Lots.....75&10%
Columbian Hdw. Co., Gem.....60&10%
Parker Wire Goods Co., King..75&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme .....60&10%
Chief 70%
Crown .....70&10%
Czar 65%
V Brace.....70&10%
Czar Harness.....50&10%

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton .....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Rush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25

Grass.....Nos.	1	2	3	4
Best	$1.50	1.75	2.00	
Common ...	$1.30	1.30	1.40	1.60

Potato and Manure.....60&15%
Whiffletree .....lb. 5¾@6¢
Hooks and Eyes:
Brass .....60&10&10@70%
Malleable Iron.....70&10@75%
Covert Mfg. Co. Gate and Scuttle Hooks 35%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ℔ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horse.*

Hose, Rubber—

Garden Hose. ¾-inch:
Competition .....ft. 5 @ 6 ¢
3-ply Standard.....ft. 8 @ 9 ¢
4-ply Standard.....ft. 10 @11 ¢
3-ply extra.....ft. 11 @13 ¢
4-ply extra.....ft. 14 @16 ¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8 @ 9 ¢
Fair Quality.....ft. 10 @11 ¢

Irons— Sad—

From ¼ to 10.....lb. 2¾@3 ¢
B. B. Sad Irons.....lb. 3¼@3½¢
Chinese Laundry.....lb. 4¾@5 ¢
Chinese Sad.....lb. 4 @4¼¢
Mrs. Potts', cents per set:

Nos.	50	55	60	65
Jap'd Tops....	62	59	72	69
Tin'd Tops....	65	62	75	72

New England Pressing.lb. 3¾@4¢

Pinking—

Pinking Irons.....doz. 50@60¢

Soldering—

Soldering Coppers, 2½ & 3.20@21¢
1½ & 2.....22@23¢

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&5%
Steel .....45&2%
Covert's Saddlery Works:
Daisy .....60&10%
Victor 60%
Lockport 50%
Lane's Steel.....30&10&5%
Richards' Tiger Steel, No. 130.....40%

Kettles—

Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%

Corn—

Withington Acme, ℔ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....70&10@75&10%
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Ohio Tool Co.'s.....70%
Swan's .....70&10&2½%
Watrous 16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge.....per doz. $5.50
Iwan's Sickle Edge.....℔ doz. $9.50
Iwan's Serrated.....℔ doz. $10.00

Mincing—

Buffalo .....℔ gro. $13.00

Miscellaneous—

Farriers' .....doz. $3.00@3.25
Wostenholm's .....℔ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber tip.....gro.$1.15@1.20
Carriage, Jap., all sizes..... gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%
Picture, Sargent's.....60&10&10%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....40%
Climax Shelf, No. 113.....40%
Trolley, No. 109.....40%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading 60%
Sargent's .....50&10%

Lanterns—Tubular—

Regular Tubular, No. 0..... doz. $4.35@4.75
Lift Tubular, No. 0.doz. $4.75@5.25
Hinge Tubular, No. 0..... doz. $4.75@5.25
Other Styles.....40&10@40&10&5%

Bull's Eye Police—

No. 1, 2¾-inch.....$2.50@2.75
No. 2, 3-inch.....$2.75@3.00

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—

Roggin's Latches, with screw.. doz. 35@40¢

Door—

Richards' Bull Dog, Heavy, No. 125.40%
Richards' Trump, No. 127.....50%

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.....35%

Lifters, Transom—

R. & E.....33⅓%

Lines—

Wire Clothes, Nos. 18 19 20
100 feet.....$2.20 2.00 1.65
75 feet.....$1.80 1.70 1.30

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....30%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....28%
Anniston Waterproof Clothes, 50 ft., ℔ gro., $24.00; Gilt Edge, $22.00; Air Line, $22.00; Acme, $17.00; Alabama, $15.00; Empire, $14.00; Advance, $13.50; Oriole, $20.00; Albemarle, $13.50; Eclipse, $12.50; Chicago, $11.00; Standard, $10.00; Columbia, $8.50; Allston, $12.50; Calhoun, $11.00.

Locks— Cabinet—

Cabinet Locks..33⅓@33⅓&7½%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....45&20%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

Elevator—

Stowell's 50%

Padlocks—

Wrought Iron....75&10&5@80&5%
R. & E. Mfg. Co. Wrought Steel and Brass .....75@75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass.....62½%
Crescent .....50&10%
Iron 62½%
Window Ventilating.....60%
Robison Patent Ventilating Sash Lock.....40%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Pullman Patent Ventilating Lock..25%
Reading 60%

Machines—Boring—

Com. Upr't, without Augers.$2.00
Com. Ang'l'r, without Augers.$2.25
Without Augers.
R. & E. Mfg. Co.: Upright. Angular.
Improved No. 3..$4.25 No. 1..$5.00
Improved No. 4.. 3.75 No. 2.. 3.38
Improved No. 5.. 2.75
Jennings', Nos. 1 and 4.....35&5%
Millers' Falls..... 5.75
Snell's, Rice's Pat. 2.50 2.75

Corking—

Reisinger Invincible Hand Power.... ℔ doz. $48.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake 20%

Ice Cutting—

Chandler's 12½%

Washing—

Boss Washing Machine Co.:	Per doz.
Champion Rotary Banner No. 1.	$54.00
Standard Champion No. 1.	$48.00
Standard Perfection.	$26.00
Cinti Square Western.	$30.00
Uneeda American, Round.	$29.00

Mallets—

Hickory .....45&5@50%
Lignumvitæ .....45&5@50%
Tinners' Hickory and Apple-wood .....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mashers, Vegetable—

Western, W. G. Co., Potato....60&10%

Mats, Door—

Elastic Steel (W. G. Co.).....10%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....25&30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10&60%
Parker's Box and Side.....50&10&60%
Swift, Lane Bros. Co.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheap .....*all sizes, $1.75@2.00*
Good .....*all sizes, $2.25@2.50*

	10	12	14	16-In.
High Grade..4.25	4.50	4.75	5.00	
Continental .....60&5%				
Great American.....70%				
Great American Ball B'r'g, new list.70%				
Quaker City.....70%				
Pennsylvania .....60&5%				
Pennsylvania, Jr., Ball Bearing....60%				
Pennsylvania Golf.....50%				
Pennsylvania Horse.....33⅓&5%				
Pennsylvania Pony.....40&5%				

Philadelphia:
Styles M., S., C., K., T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—

Wire Nails and Brads, Papered, List July 20, 1899..85&10&10@90%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain ..	28	26	25	24	25	60
Coleman	13	12	12	11	11	.....net
New Haven..	23	21	20	19	18	...40&5%
Putnam	23	21	20	19	18	....33⅓%
New Putnam.	19	18	17	16	16	..10&10%
Western						℔ lb 8½ ¢

Jobbers' Special Brands..... per lb. 8½@10¢

Picture—

	1½	2	2½	3	3½ in.
Brass H'd.	.55	.55	.60	.70	.. gro
Por. Head.	.. 1.10	1.10	1.10	..	gro

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: *Off list.*
Mfrs. or U. S. Standard.
Square, plain.....$5.10
Hexagon, plain.....$5.60
Square, C. T. & R......$5.30
Hexagon, C. T. & R......$6.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square, Blank.....$5.60
Hexagon, Blank.....$6.00
Square, Tapped.....$5.60
Hexagon, Tapped.....$6.00

Oakum—

Best or Government.....lb. 6½¢
Navy .....lb. 5 ¢
U. S. Navy.....lb. 6 ¢
Plumbers' Spun Oakum.....2½¢
In carload lots ¼¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc .....65&10%
Chase or Paragon:
Brass and Copper...45&10@50%
Tin or Steel.....65&10%
Zinc .....65&10%
Malleable, Hammers' Imp'ed, No. 1, $3.60; No. 2, $4; No. 3, $4.40. ℔ doz. 20%
Malleable, Hammers' Old Pattern, same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70&70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can—

French .....doz. 35¢
Iron Handle.....Per doz. 25@27¢
Sprague, Iron Handle Per doz. 35@40¢
Sardine Scissors...doz. $1.75@$3.00
National 50%
Stowell's Sprague.....℔ doz. 35@45¢

Egg—

Nickel Plate.....℔ doz., $2.00
Silver Plate.....℔ doz., $4.00

Packing—

Asbestos Packing, Wick and Rope .....lb. 1½@16¢

Rubber—

(Fair quality goods.)
Sheet, C. I. ..... 8@10¢
Sheet, C. O. S. ..... 9@13¢
Sheet, C. B. S. ..... 10@1½¢
Sheet, Pure Gum.....50@65¢
Sheet, Red.....40@50¢
Jenkins' '96, ℔ lb 80¢.....25@25&5%

Miscellaneous—

American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute .....lb. 4@ 4½¢
Russia Packing.....lb. 8@11 ¢

Pails, Creamery—

S. S. & Co., with gauges—No. 1, $6.25; No. 2, $6.50 ℔ doz.

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List....60&10@60&10&5%

Fry—

Common Lipped:

Nos.	1	2	3	4	5
Per doz. .	$0.75	0.80	0.90	1.10	1.30

Refrigerator, Galva.—

Inch	12	14	16	18
Per doz.....	$1.95	2.25	2.80	3.15

Roasting and Baking—

Regal, S., S. & Co., ℔ doz., Nos. 5, $1.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory ℔ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ℔ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

Asbestos: lb.
Building Felt.....2¾¢
*Mill Board, sheet, 40x40 in.*3½¢
Mill Board, roll, thicker than 1-16 inch.....3½¢
Mill Board, 1-16 inch thick and less.....2½¢ Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll .....$5@10¢
Medium weight, 30 lbs. to roll. .....40@45¢
Heavy weight, 40 lbs. to roll.. .....56@60¢
Black Water Proof Sheathing. 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....$38.00@40.00
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—

1 ply (roll 300 sq. ft.), ton.... $32.50@35.50
2 ply, roll 108 sq. ft.....55¢@60¢
3 ply, roll 108 sq. ft.....78¢@85¢
Slater's Felt (roll 500 sq. ft.) .75¢
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....$2.75

Sand and Emery—

Flint Paper and Cloth.60@60&10%
Garnet Paper and Cloth....25%
Emery Paper and Cl'h .50&10@60%

Parers— Apple—

Advance	℔ doz.	$4.00
Baldwin	℔ doz.	$4.00
Bonanza Improved	each	$6.50
Daisy	℔ doz.	$4.00
Dandy	each	$7.50
Eureka Improved	each	$20.00
Family Bay State	℔ doz.	$15.00
Improved Bay State	℔ doz.	$36.00
Little Star	℔ doz.	$5.00
New Lightning	℔ doz.	$7.00
Reading 72	℔ doz.	$3.25
Reading 78	℔ doz.	$6.25
Rocking Table	℔ doz.	$8.20
Turn Table '98	℔ doz.	$6.00
White Mountain	℔ doz.	$5.00

Potato—

Saratoga	℔ doz.	$7.00
White Mountain	℔ doz.	$6.00

Picks and Mattocks—

List Feb. 23, 1899..70&10@75&10%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass.....60@60&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—

Standard, 2-6 in.....50&10%
Extra Heavy, 2-6 in.....65%
Fittings.....70%

Pipe, Merchant—

Carload Lots.

	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
¼ & ⅜ in..	*68½%*	*52½%*	*66½%*	*50½%*
⅜ & ½ in..	*72½%*	*60½%*	*70½%*	*58½%*
¾ to 6 in..	*75½%*	*66½%*	*75 %*	*65 %*
7 to 12 in..	*71½%*	*56½%*	*70 %*	*54½%*

Pipe, Sewer—

Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.:
New England.....67%
New York and New Jersey.70%
Maryland, Delaware, E. Pa.72%
West. Pa. and West Va....73%
Virginia.....75%
Ohio, Michigan and Ky....75%
Indiana.....77%
NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:	C. L.	L. C. L.
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual.....40&10%
Bench, Second qual.....50&10%
Molding.....33⅓&10%
Bailey's (Stanley R. & L. Co.).....5&10@25&10&10%
Chapin-Stephens Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding.....33⅓@33⅓&10%
Toy and German.....40@40&10%
Chaplin's.....60%
Ohio Tool Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding.....33⅓@33⅓&10%
Adjustable Wood Bottom.....60%
Union.....60%

Iron Planes—

Bailey's (Stanley R. & L. Co.).....25&10@25&10&10%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....20&10@20&10&10%
Ohio Tool Co.'s Iron Planes.....60%
Sargent's.....60&10%
Union.....60%

Plane Irons—

Wood Bench Plane Irons.....25&10@50%
Buck Bros.....30%
Chapin-Stephens Co.....30@30&10%
Ohio Tool Co.....30%
Stanley R. & L. Co..20&10@20&10&10%
Union.....50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $8.50

Plates—

Felloe.....lb. 3¾@4¼¢
Self-Sealing Pie Plates (S., S. & Co.), ℔ doz. $2.00.....50%

Pliers and Nippers—

Button Pliers.....75&10@80%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 in. $2.00, 8 in. $2.25, 10 in. $3.00, 12-in. $3.75.
Acme Nippers.....50@50&5%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's.....60%
Improved Button.....60&10%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers.....30@30&10%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.: Pliers and Nippers, all kinds.....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10&10%
Chapin's Imp. Brass Cor.40@40&10&10%
Pocket Levels.....30@30&10&10%
Disston's Plumbs and Levels.....70%
Disston's Pocket Levels.....70%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable.....40&7½%
Stanley R. & L. Co..30&10@30&10&10%
Stanley's Duplex.....20@20&10&10%
Woods' Extension.....33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—

Bulk and 1-lb. papers....lb. 8 ¢
½-lb. papers.....lb. 8¾¢
¼-lb. papers.....lb. 9½¢

Pokes, Animal—

Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

Police Goods—

Manufacturers' Lists..25@25&5%
Tower's.....25%

Polish—Metal—

Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72....40%
Prestoline Paste.....40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside.....℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese.....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....℔ doz. $1.00
Black Silk, 5 oz. box.....℔ doz. $0.75
Black Silk, ½ pt. liq.....℔ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. $9.00
1 qt., Round.....gro. $10.00
1½ qt., Square.....gro. $11.00
2 qt., Square.....gro. $13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb.....each 45¢
Fine Sporting, 1 lb....each 75¢
Rifle, ½-lb.....each 15¢
Rifle, 1-lb.....each 25¢
King's Semi-Smokeless:

Keg (25 lb bulk)		$6.50
Half Keg (12½ lb bulk)		$3.50
Quarter Keg (6¼ lb bulk)		$1.90
Case 24 (1 lb cans bulk)		$8.50
Half case (1 lb cans bulk)		$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun..50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co.....20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Cork—

Invincible Cork Puller.....$21.00

Pullers, Nail—

Cyclops.....50%
Miller's Falls, No. 3, ℔ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00.....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Pelican, ℔ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B, No. 2, case lots.....℔ doz. $8.00
Diamond B, No. 3, case lots.....℔ doz. $5.50
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15.....40%

Pulleys, Single Wheel—

Inch	*2*	*2½*	*3*
Awning, doz.	*$0.55*	*.85*	*1.15*
Hay Fork, Swivel or Solid Eye. doz., ¼ in., $1.05; 5 in., $1.35			
Inch	*2*	*2¼*	*2½*
Hot House, doz.	*$0.70*	*.90*	*1.25*
Inch	*1¼*	*1½*	*2*
Screw, doz.	*$0.16*	*.19*	*.23*	*.30*
Inch	*1¾*	*2*	*2¼*	*2½*
Side, doz.	*$0.30*	*.40*	*.55*	*.63*
Inch	*1½*	*1¾*	*2*	*2½*
Tackle, doz.	*$0.30*	*.42*	*.58*	*1.00*

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in.....16@19¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in..16@19¢
Acme.....1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 4, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Ideal.....70&10%
Niagara.....1¾ in. 16¢; 2 in., 19¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern.....60@60&10%
Pitcher Spout.....80@80&5%
Wood Pumps, Tubing, &c..45@50%
Barnes Dbl. Acting (low list)..50&10%
Barnes' Pitcher Spout.....80%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $7.20
Flint & Walling's, Fast Mail Hand, (low list).....55%
Flint & Walling's Fast Mail (low list).....55&5%
Flint & Walling's Tight Top Pitcher.80%
National Specialty Mfg. Co., Measuring, $6.00.....30%
Mechanical Sprayer.....7.20
Myers' Pumps (low list).....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	*2*	*2¼*	*2½*	*2¾*
	$2.20	*2.50*	*2.75*	*3.00*
Inch...	*3*	*3¼*	*3½*	*3¾*	*4*
	$3.30	*3.60*	*3.85*	*4.10*	*4.40*

Plunger Cup Leathers—Per 100:

Inch...	*2½*	*3*	*3½*	*4*
	$2.75	*3.85*	*5.00*	*6.00*

Punches—

Saddlers' or Drive, good..... doz. 50@75¢
Spring, single tube, good quality.....$1.75@2.00
Revolving (4 tubes)..... doz. $3.50@3.75
Bemis & Call Co.'s Cast St'l Drive.50%
Bemis & Call Co.'s Check.....55%
Morrill's No. 1 (A.B.C.), ℔ doz. $15.50
No. 2, ℔ doz. $22.50.....50%
Hercules, each $7.50.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Steel Screw, B. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co.35@35&5%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44.....60%

Rail—Barn Door, &c.—

Cast Iron Barn Door; Flange Screw Holes for Rd. Groove Wheels:

½	⅝	¾ in.	
$1.70	*$2.10*	*$3.00*	*100 feet.*

Angular for Sq. Groove Wheels:

Small.	*Med.*	*Large.*	
$1.50	*$1.90*	*$2.60*	*100 feet.*

Sliding Door, Painted Iron..... 2½@2¾¢
Sliding Door, Wrought Brass, 1½ in., lb., 36¢.....30%
Allith Mfg. Co.:
No. 1, Reliable Hgr. Track, ℔ ft. 5½¢
No. 2, Reliable Hgr. Track, ℔ ft. 7¢
Cronk's:
Double Braced Steel Rail....℔ ft. 3¢
O. N. T. Rail.....2¾¢
Griffin's:

xxx, ℔ 100 ft., 1 x 3-16 in.,	$3.00;
1¼ x 3-16 in.,	3.50.

Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.70; 1¼ in., $4.40.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.40.
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢..50%
None Better.....℔ ft. 3¾¢
Standard.....℔ ft. 4¢
Myers' Stayon Track.....60%
Richards' Mfg. Co.:
Common 1 x 3-16 in., $2.75; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail.....$4.40
Fire Door Track, ℔ ft., 2⅜ x ⅝, 15¢; 3½ x ⅝, 9¢.
Lag Screw Rail, No. 65.....40%
Gauge Trolley Track, ℔ ft., No. 31, 10¢; No. 32, 15¢; No. 33, 24¢.
Safety Door Hanger Co.'s Storm King Safety.....60%
Safety Door Hanger Co.'s U. S. Standard.....60%
Stowell's:
Cast Rail.....℔ ft. 1¾¢
Steel Rail, Plain.....25%
Wrought Bracket, 1 3-16 in....℔ ft. 3¢
Wrought Bracket, 1⅛ x 5-16...℔ ft. 7¢
Swett's Hyle, ℔ ft. 11¢.....60%
P L B Steel Rail.....℔ 100 ft. $3.90
No. 0, 1 x 3-16.....℔ 100 ft. $2.75

Rakes—

Net Prices, Malleable Rakes:

	10	*12*	*14*	*16-tooth*
Shank	*$1.50*	*1.60*	*1.75*	*1.85*
Socket	*$1.65*	*1.80*	*1.95*	*2.10*

Steel, Garden and Gravel, Aug. 1, '99, List.....70%
Malleable Iron, Garden..70&10%
Lawn Rakes, M't'l Head, per doz. 20 teeth.....$3.25@3.50
24 teeth.....$3.50@3.75
Weldless Steel Garden.....75&5
Fort Madison Red Head Lawn...$2.75
Fort Madison Blue Head Lawn...$2.75
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Kohler's:
Lawn Queen, 20-tooth.....℔ doz. $3.45
Lawn Queen, 24-tooth.....℔ doz. $3.60
Paragon, 20-tooth.....℔ doz. $2.75
Paragon, 24-tooth.....℔ doz. $2.90
Steel Garden, 14-tooth....℔ doz. $2.85
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—

Disston's.....75
Heller Bros.'.....70&5@70&10&5
McCaffrey's American St'd...60&10&5
New Nicholson.....70&10@75
See also Files.

Razors—

Borasic.....60%
Fox Razors, No. 42..℔ doz. $20.00
Fox Razors, No. 44..℔ doz. $20.00
Fox Razors, No. 82, Platina.... ℔ doz. $25.00
Red Devil.....60
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40

Safety Razors—

Silberstein.....40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¾, M 16, Q 16, A 16, B 16, 4008, Rubber Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25
1240 N., 124 N.....20
3004 N, 06 N, 6 RM, G 9.....25
4 N, 6 PN, 24 N, 26 PN.....25
2904 P.....33⅓
2904 PN.....33⅓
0924 N.....33⅓
02084 N.....33⅓
002904 PN.....33⅓
802 N.....33⅓
986 PN, 2904 N, 974 PN.....25
5009 PN, 5009 N.....20
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20
304 P, 304 PN, 00304 P, 00304 PN.33⅓

Registers—*List July 1, 1903.*

Black Jap.....75%
Bronzed.....75

Revolvers—

Single Action.....85@190¢
Double Action, except 44 cal..$1.90
Double Action, 44 caliber....$2.05
Automatic.....$3.60
Hammerless.....$4.10
NOTE.—Jobbers frequently cut the above prices of manufacturers for small trade.

Riddles, Hardware Grade

16 in.....per doz. $2.25@2.50
17 in.....per doz. $2.50@2.75
18 in.....per doz. $2.75@3.00

Rings and Ringers—

Bull Rings—

Steel	*2*	*2½*	*3 inch.*
	$0.70	*0.75*	*0.80 doz.*
Copper	*$1.00*	*1.15*	*1.40 doz.*

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes, $4.00@4.25
Hill's Ringers, Gray Iron..... doz. 50@55¢
Hill's Ringers, Malleable Iron.. doz. 70@75¢
Blair's Rings...per gro. $4.75@5.00
Blair's Ringers..per doz. $0.60@.65
Brown's Rings..per gro. $5.00@5.25
Brown's Ringers..per doz. $0.65@.70

Rivets and Burrs—

Copper.....50&10@60%
Iron or Steel.....75@75&5%

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60
Cronk's Stay.....75¢
Cronk's Brinkerhoff.....90¢
Lane's Stay.....40
Richards' Stay:
Handy Adj. and Reversible No. 53.50%
O. K. Adj. and Reversible No. 58.50%
Lag Screw, Nos. 55 and 57.....50%
Fire Door, No. 59.....40
Favorite, No. 54.....40
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction.....50
Screw and Spike Stay.....℔ doz. 65¢
Hinge Adjustable Stay.....℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger:
Mixed.....lb., 11¼@11½¢
Pure.....lb., 12¼@12½¢
Sisal, 7-16 in. diam. and larger:
Mixed.....lb., 8¼¢
Pure.....lb., 9¾@10¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed.....lb., 8¼¢
Pure.....lb., 9¾@10¢

Sisal, Tarred, Medium Lath Yarn:
Mixed ..... *lb., 8 ¢*
Pure ..... *lb., 9¼@9½¢*
Cotton Rope: *Lb.*
Best, ¼-in. and larger ..... *16½¢*
Medium, ¼-in. and larger ..... *14½¢*
Common, ¼-in. and larger ..... *10½¢*
Jute Rope:
Thread No. 1, ¼-in. & up, lb. ..... *6½¢*
Thread No. 2, ¼-in. & up, lb. ..... *5¾¢*
Old Colony Manila Transmission Rope ..... ℔ lb 17½¢

Wire Rope—

Galvanized ..... *42½&2½%*
Plain ..... *50&2½%*

Ropes, Hammocks—

Covert Mfg. Co.:
Jute ..... 50&5%
Sisal ..... 35&5%
Covert Saddlery Works ..... 60&5%

Rules—

Boxwood ..... *60&10&10%*
Ivory ..... *35&10@35&10&5%*
Chapin-Stephens Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35@35&10&10%
Miscellaneous ..... 50@50&10&10%
Combination ..... 55@55&10%
Stationers' ..... 10@10&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber 60%
Stanley R. & L. Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35@35&10&10%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—

See *Balance, Sash.*

Sash Locks—

See *Locks, Sash.*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers

See *Stuffers or Fillers, Sausage.*

Saw Frames—

See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins':
Circular 50%
Band ..... 50&10@60%
Cross Cuts ..... 35&5%
Mulay, Mill and Drag 50%
One-Man Saw 40%
Wood Saws 40%
Hand, Compass, &c 40%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&5%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 14 in. wide 60%
Band, ¾ to 1¾ 60%
Crosscuts 50%
Narrow Crosscuts 55%
Mulay, Mill and Drag 50%
Framed Woodsaws 35%
Woodsaw Blades 35%
Woodsaw Rods 25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c 25%
Butcher Saws and Blades 35%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws ..... 35&5%
Framed Wood Saws 30%
Hand Saws ..... 20&2½%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 50%
Crescent Ground Cross Cut Saws 35%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 50%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c ..... 25@25&7½%
Wood Saws ..... 35@35&7½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws ..... 40&10@50%
Butcher Saws Blades ..... 35@40%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saws—

Atkins' Hack Saw Blades A A A .. 25%
Disston's:
Concave Blades 25%
Keystone 40%
Hack Saw Frames 30%
Fitchburg File Works, The Best 25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades 40%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades 35%
Diamond Hack Saw Frames 50%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades 35%
Sterling Hack Saw Frames ..... 30&10&5%

Scroll—

Barnes' No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $4.00 ..... 15&10%

Scalers, Fish—

Covert's Saddlery Works ..... 60&10%

Scales—

Family, Turnbull's ..... *50@50&10%*
Counter:
Hatch, Platform, ½ oz. to 4 lbs. ..... *doz. $5.50*
Two Platforms, ½ oz. to 8 lbs. ..... *doz. $16.00*
Union Platform, Plain ..... *$1.70@1.90*
Union Platform, Stpd. ..... *$1.85@2.15*
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
Chicago Scale Co.:
The "Little Detective" ..... 25 lbs 50%
Union or Family No. 2 ..... 60%
Portable Platform (reduced list) 50%
Wagon or Stock (reduced list) ..... 25@35%
"The Standard" Portables 50%
"The Standard" R. R. and Wagon 50%

Scrapers—

Box, 1 Handle ..... *doz. $2.00@2.25*
Box, 2 Handle ..... *doz. $2.60@2.85*
Ship ..... *Light, $2.00; Heavy, $4.50*
Adjustable Box Scraper (S. R. & L. Co.). $6.00 ..... 30@30&10%
Chapin-Stephens Co., Box ..... 50@50&10%

Screens, Window and Frames—

Flyer Pattern Screens ..... 60&5@60&5&2½%
Maine Screen Frames ..... 40&10&5%
Perfection Screens ..... 60&5@60&5&2½%
Phillips' Screen Frames ..... 60&5@60&5&2½%
See also *Doors.*

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, W'd, Beech ..... *doz. 30@30&5%*
Hand, Wood ..... *30@30&5%*
R. Bliss Mfg. Co., Hand ..... 30@30&10%
Chapin-Stephens Co., Hand ..... 30@30&10%
Ohio Tool Co., Bench and Hand 30%

Coach, Lag and Hand Rail—

Lag, Cone Point, list Oct. 1, '99 ..... *80&5%*
Coach, Gimlet Point, list Oct. 1, '99 ..... *80%*
Hand Rail, list Jan. 1, '81 ..... *70&10@75%*

Jack Screws—

Standard List ..... *75&10@80&5%*
Millers Falls ..... 50&10&10%
Millers Falls, Roller ..... 50&10%
P. S. & W. ..... 50@50&5%
Sargent ..... 70&10%
Swett Iron Works ..... 75&10@80&5%

Machine—

List Jan. 1, '98:
Flat or Round Head, Iron ..... *50@50&10%*
Flat or Round Head, Brass ..... *50@50&10%*

Set and Cap—

Set (Iron or Steel) ..... *80@80&10&10%*
Sq. Hd. Cap ..... *75@75&10%*
Hex. Hd. Cap ..... *75@75&10%*
Rd. or Fillister Hd. Cap ..... *65@65&10%*

Wood—

List July 23, 1903.
Manufacturers' printed discounts:
Flat Head, Iron ..... *87½&10@...%*
Round Head, Iron ..... *85 &10@...%*
Flat Head, Brass ..... *85 &10@...%*
Round Head, Brass ..... *80 &10@...%*
Flat Head, Bronze ..... *77½&10@...%*
Round Head, Bronze ..... *75 &10@...%*
Drive Screws ..... *87½&10%*

Scroll Saws—

See *Saws, Scroll.*

Scythes—

Per doz.
Prices announced for next season:
Clipper Pattern, Grass *$6.20*
Full Polished, Clipper *$6.75*
Grain *$8.00*
Clipper, Grain *$8.25*
Weed and Bush *$6.25*

Seeders, Raisin—

Enterprise ..... 25&30%

Sets—Awl and Tool—

Brad Awl and Tool Sets:
Wood Handle, 10 Awls ..... *doz. $2.00@2.25*
Wood Handle, 14 Awls, 6 Tools ..... *doz. $2.50@2.60*
Aiken's Sets, Awl and Tools:
No. 20, ℔ doz. $10.00 ..... 50&10&10%
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 ..... 15&10%
Stanley's Excelsior:
No. 1, $7.50; No. 2, $4.00; No. 3, $5.50 ..... 30@30&10&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00

Nail—

Square ..... *per gro. $2.25@2.50*
Round, Blk. and Pol., assorted. ..... *gro. $1.80@2.00*
Octagon ..... *gro. $3.50@3.75*
Buck Bros. 27½%
Cannon's Diamond Point, ℔ gro. $12 ..... 25%
Mayhew's ..... ℔ gro. $9.00
Snell's Cannon's Diamond Point ..... ℔ gro. $7.20
Snell's Cor'gated, Cup Pt. ..... ℔ gro. $7.20
Snell's Knurled, Cup Pt. ..... ℔ gro. $7.20
Springfield Mach. Screw Co.:
Diamond Knurled Cup Pt. ℔ gro. $7.50

Rivet—

Regular list ..... *75@75&10%*

Saw—

Aiken's:
Genuine ..... 50&10%
Imitation ..... 50&10%
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut 30%
Plate 20%
Disston's Star and Monarch 25%
Morrill's No. 1, $15.00 ..... 50%
Nos. 3 and 4, Cross Cut, $20.63 ..... 50%
No. 5, Mill, $30.00 ..... 50%
Nos. 10, 11, 95, $15.63 ..... 50%
No. 1 Old Style, $10.00 ..... 50%
Special, $16.25 ..... 50%
Giant Royal, Cross Cut ..... ℔ doz. $8.50
Royal, Hand ..... ℔ doz. $5.00
Taintor Positive ..... ℔ doz. $6.75

Shaving—

Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00

Sharpeners, Knife—

Chicago Wheel & Mfg. Co 65%

Shaves, Spoke—

Iron ..... *doz. $1.00@1.15*
Wood ..... *doz. $1.75@2.00*
Bailey's (Stanley R. & L. Co.) ..... 30@30&10&10%
Chapin-Stephens Co ..... 30@30&10&10%
Goodell's ℔ doz. $9.00 ..... 15&10%
Wood's F1 and F2 ..... 50%

Shears—

Cast Iron..	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good ...	*$13.00*	*15.00*	*17.00 gro.*
Cheap ..	*$5.00*	*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality, Jap ..... *70&10&10%*
Best quality, Nickel ..... *60&10&10%*
Fair quality, Jap ..... *80@80&5%*
Fair quality, Nickel ..... *75@75&10%*
Tailors' Shears ..... *40@40&10%*
Acme Cast Shears ..... 40@40&5
Heinisch's Tailor's Shears 10%
Wilkinson's Hedge, 1900 list 45%
Wilkinson's Branch, Lawn & Border 40%
Wilkinson's Sheep, 1900 list 50%

Tinners' Snips—

Steel Blades ..... *20&5@20&10%*
Steel Laid Blades ..... *40&10@50%*
Forged Handles, Steel Blades, Berlin ..... 40@40&10%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6¼ to 10 in. 50%
Niagara Snips 40%
P. S. & W. Co 20%

Pruning Shears and Tools

Cronk's Grape Shears 33⅓%
Cronk's Pruning Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades ..... 40@40&5%
Orange Shears ..... 50&10@50&20%
Grape ..... 40&10@50%
Tree Pruners 75%
P., S. & W. Co 33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction 50%
Patent Roller, Hatfield's, Sargent's list ..... 70&10%
Reading 60%
R. & E. list 33⅓%
Wrightsville Hatfield Pattern 80%

Sliding Shutter—

Reading list ..... 45&20%
R. & E. list 33⅓%
Sargent's list ..... 50&10%

Shells—Shells, Empty—

Brass Shells, Empty:
First quality, all gauges ..... 60&5%
Climax, Club, Rival, 10 and 12 gauge ..... 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge ..... 25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge 20%
Climax, Union, League, New Rival, 10 and 12 gauge 25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list) 20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge ..... 33⅓&5%
Robin Hood, Low Brass ..... 20&10%
Robin Hood, High Brass ..... 30&10%

Shells, Loaded—

Loaded with Black Powder *40%*
Loaded with Smokeless Powder, medium grade ..... *40&5%*
Loaded with Smokeless Powder, high grade ..... *50&10&10%*
Robin Hood Smokeless Powder:
Robin Hood, Low Brass 50%
Comets, High Brass ..... 50&10&5%

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron ..... *per keg $4.00*
Steel ..... *per keg $3.75*
Burden's, all sizes ..... ℔ keg $3.90

Shot—

Drop, up to B, 25-lb. bag *$1.65*
Drop, B and larger ..... *per 25-lb. bag, $1.90*
Buck, 25-lb. bag *$1.90*
Chilled, 25-lb. bag *$1.90*

Shovels and Spades—

Association List, Nov. 15, 1902 ..... *40%*

Sieves and Sifters—

Hunter's Imitation ..... *gro. $10.50@11.00*
Hunter's Genuine ..... *per gro. $12.00@12.50*
Buffalo Metallic Blued, S. S. Co., ℔ gr.:

14&16	16&18	18&20
$13.20	$13.50	$14.40

Shaker (Barler's Pat.) Flour Sifters, ℔ doz., $2.00 ..... 20%

Sieves, Seamless Metallic

	Per dozen.			
Mesh	*14*	*16*	*18*	*20*
Iron Wire ..	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire ..	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .... *doz. $0.90@0.95*
Mesh 20, Nested .... *doz. $1.00@1.05*
Mesh 24, Nested .... *doz. $1.30@1.40*

Sinks, Cast Iron—

Standard list ..... *60@60&10%*

NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron ..... *80&10@80&10&10%*
Steel ..... *40@40&10%*

Slates, School—

Factory Shipments.
"D" Slates ..... *50@50&10%*
Eureka, Unexcelled Noiseless .. *60&5 tens*
Victor A, Noiseless ..... *60&5 tens &5%*

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German ..... *40@40&10%*
Covert Mfg. Co.:
Derby ..... 30&5&2%
High Grade 45%
Jockey ..... 30&10%
Trojan 45%
Yankee ..... 30&5&2%
Yankee, Roller ..... 30&5&2%
Covert's Saddlery Works:
Crown 60%
German 60%
Model 60%
Triumph 60%
Oneida Community:
Solid Swivel 60%
Sargent's Patent Guarded ..... 66⅔&10%

Snaths—

Scythe *50%*

Snips, Tinners—See *Shears.*

Spoons and Forks—Silver Plated—

Good Quality ..... *50&10@60&5%*
Cheap ..... *60@60&10%*
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous—

German Silver ..... *60@60&5%*
Cattaraugus Cutlery Co.:
Seneca Silver 50%

Tinned Iron—

Teas ..... *per gro. 45@50¢*
Tables ..... *per gro. $0.90@1.00*

Springs—Door—

Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 20%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 30 in. ..... ℔ doz. $1.10
Victor (Coil) ..... 50&10&10%

Carriage, Wagon, &c.—

1¼ in. and Wider:	*Per lb*
Black	*4@4¼¢*
Half Bright	*4@4¼¢*
Bright	*4½@4¾¢*

Painted Seat Springs:
1½ x 2 x 26 ..... *per pr. 42¢*
1½ x 3 x 28 ..... *per pr. 70¢*

Sprinklers, Lawn—

Enterprise ..... 25&30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24 ..... 30%

Squares—

Nickel plated .. } *List Jan. 5, 1900.*
Steel and Iron .. } *75&75&5%*
Rosewood Hdl. Try Square and T-Bevels ..... *60&10&10@70%*
Iron Hdl. Try Squares and T-Bevels ..... *40&10@40&10&10%*
Disston's Try Sq. and T-Bevels 70%
Winterbottom's Try and Miter ..... 40&10@40&10&10%

Squeezers, Lemon

Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... *doz. $1.00*
Good Grade ..... *doz. $1.25*
Tinned Iron ..... *doz. $0.75@1.25*
Iron, Porcelain Lined .. *doz. $1.75*

Staples—

Barbed Blind ..... *lb. 6@6½¢*
Electricians', Association list .. *80&10&10&10%*
Fence Staples, Plain, $2.25; Galvanized *$2.55*
Poultry Netting Staples ..... *per lb. 3½@3½¢*
Grand Crossing Tack Co.'s list .. 80&10

Steels, Butchers'—

Dick's 30%
Foster Bros.' 30%
C. & A. Hoffmann's 40%

Steelyards ..... 30@30&10%

Stocks and Dies—

Blacksmiths' ..... *50@50&10%*
Curtis Rev'ble Ratchet Die Stock 25%
Derby Screw Plates 25%
Gardner Die Stocks No. 1 ..... 50%
Gardner Die Stocks, larger sizes 40%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stone—Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ℔ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots ..... ℔ gro. $9.00
One gross or more ..... ℔ gro. $7.20
Lots of 10 gross or more .. ℔ gro. $6.00

Pike Mfg. Co., 1901 list:
Black Diamond S. S., ℔ gro. $12.00
Lamoille S. S., ℔ gro. $11.00
White Mountain S. S., ℔ gro. $9.00
Green Mountain S. S., ℔ gro. $6.00
Extra Indian Pond S. S., ℔ gro. $7.50
No. 1 Indian Pond S. S., ℔ gro. $7.00
No. 2 Indian Pond S. S., ℔ gro. $4.50
Leader Red End S. S., ℔ gro. $4.50
Emery and Corundum, 10 in., ℔ gro. $9.00
Pure Corundum, 10 in., ℔ gro. $12
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%

Oil Stones, &c.—

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit..50%
Gem Corundum Axe, Single or Double Grit..... 55%
Gem Corundum Slips..... 55%
Gem Corundum Razor Hones..... 50%
Pike Mfg. Co., 1901 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. .60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 30¢
Lily White Slips..... 90¢
Rosy Red Slips..... 90¢
Washita Slips, Extra..... 80¢
Washita Slips, No. 1..... 70¢
Washita Slips, No. 2..... 40¢
India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit..... 33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit..... 33⅓%
Quickcut Emery Rubbing Bricks.33⅓%
Hindostan No. 1, R'g'lar, ℔ lb. 8¢
Hindostan No. 1, Small, ℔ lb 10¢
Axe Stones (all kinds)..... 33⅓%
Turkey Oil Stones, Extra, 5 to 8 in..... ℔ lb 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips..... 40¢
Sand Stone..... 6¢
Belgian, German and Swaty Razor Hones..... 50%
Natural Grit Carving Knife Hones..... ℔ doz. $3.00
Quick Edge Pocket Knife Hones..... ℔ doz. $2.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50 40%

Stoners, Cherry—

Enterprise ..... 25@30%

Stoppers, Bottle—

Victor Bottle Stoppers..... ℔ gro. $9.00

Stops— Bench—

Millers Falls..... 15&10%
Morrill's, ℔ doz., No. 1, $10.00..... 50%
Morrill's, No. 2, $12.50..... 50%

Door—

Chapin-Stephens Co..... 60@60&10%

Plane—

Chapin-Stephens Co..... 20%

Straps— Box—

Cary's Universal, case lots..20&10&10%

Hame—

Covert's Saddlery Works..... 60&10%

Stretchers, Carpet—

Cast Iron, St'l Points, doz. 55@60%
Socket ..... doz. $1.75
Excelsior Stretcher and Tack Hammer Combined, ℔ doz. $6.00..... 20%

Stuffers, Sausage—

Enterprise Mfg. Co..... 25@25&7½%
National Specialty Co., list Jan. 1, 1902 ..... 30&5%

Sweepers, Carpet—

National Sweeper Co.: ℔ doz.
Auditorium, Roller Bearing (26 in. case), Nickel..... $54.00
Mammoth, Roller Bearing (30 in. case), Nickel..... $60.00
Marion, Roller Bearing, regular finishes, full Nickel..... $24.00
Marion Queen, Roller Bearing, full Nickel $24.00
Monarch, Roller Bearing, N'kel. $22.00
Monarch, Roller B'r'g, Jap'ned. $20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel..... $36.00
Monarch Extra, Roller Bearing, (17-in. case), Nickel..... $36.00
Monarch Extra, Roller Bearing (17-in. case), Japanned..... $33.00
National Queen, Fancy Veneers. $27.00
Perpetual, Regular B'r'gs, Nkl. $20.00
Perpetual, Regular B'r'gs, Jap. $18.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots

Tacks, Brads, &c.—

List Jan. 15, '99.

Carpet Tacks.....90&30&10@..%
American Cut Tacks..90&25@..%
Swedes Cut Tacks.90&30&10&5@..%
Swedes Upholsterers' Tacks.... 90&45&10&5@..%
Gimp Tacks.....90&45&10@..%
Lace Tacks.....90&45&10@..%
Trimmers' Tacks.90&30&10&5@..%
Looking Glass Tacks.70&10&5@..%
Bill Posters' and Railroad Tacks .....90&45&10@..%
Hungarian Nails....80&30&5@..%
Common and Patent Brads... 80&10&5@..%
Trunk and Clout Nails.80&10@..%

NOTE.—The above prices are for Straight Weights. An extra 5% is given on Star Weights** and an extra 10&5% on Standard Weights.****

Miscellaneous—

Double Pointed Tacks..... 90&6 or 7 tens
Steel Wire Brads, R. & E. Mfg. Co.'s list ..... 50&10@60%
See also Nails, Wire.

Tanks, Oil—

Each.
Emerald, S., S. & Co.....30-gal. $3.40
Emerald, S., S. & Co.....60-gal. $4.25
Queen City, S., S. & Co.....30-gal. $3.65
Queen City, S., S. & Co....60-gal. $4.50

Tapes, Measuring—

American Asses' Skin..40&10@50%
Patent Leather.....25@30&5%
Steel ..... 40@40&10%
Chesterman's ..... 25@25&5%
Eddy Asses' Skin..... 40&10@50%
Eddy Patent Leather..... 25@30&5%
Eddy Steel..... 40@40&10%
Keuffel & Esser Co.:
Favorite, Ass Skin..... 40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list..... 35@35&5%
Pocket ..... 35@35&5%
Lufkin's:
Asses' Skin..... 40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather....25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop.....80&2½%
Monitor, Cross Head, &c....70%

Brick Ties—

Niagara Brick Ties..... 25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works..... 60&10%

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White..... 20@20&5%

Hay—

Myers' Hay Tools..... 50%
Stowell's Hay Carriers..... 50%
Stowell's Hay Forks..... 50%
Stowell's Fork Pulleys..... 50%

Saw—

Atkins' Cross Cut Saw Tools..... 40%
Simonds' Improved..... 33⅓%
Simonds' Crescent..... 25%

Ship—

L. & I. J. White..... 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro....$11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Oneida Pattern..75&10@75&10&5%
Newhouse ..... 45@45&5%
Hawley & Norton..... 65%
Victor and Oneida.....70&10@70&10&5%
O. C. Jump (Blake Pat.)..60&5@60&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ℔ doz. $13.25
No. 3, Rat, ℔ doz. $6.50; case of 50 $5.75 doz.
No. 3½, Rat, ℔ doz. $5.25; case of 72 ℔ gro. $4.70 doz.
No. 4, Mouse, ℔ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ℔ doz. $3.00; case of 150 $2.25 doz.

Trimmers, Spoke—

Wood's E I..... 50%

Trowels—

Disston Brick and Pointing..... 30%
Disston Plastering..... 25%
Disston "Standard Brand" and Garden Trowels..... 35%
Kohler's Steel Garden Trowels, 5 in. ℔ gro. $4.80
Kohler's Steel Garden Trowels, 6 in. ℔ gro. $6.00
Never-Break Steel Garden Trowels.. ℔ gro. $6.00
Rose Brick and Plastering..... 25&5%
Woodrough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern..... 50&10%
Western Pattern..... 60&10%
Handy Trucks..... ℔ doz. $16.00
Grocery ..... ℔ doz. $15.00
Daisy Stove Trucks, Improved Pattern ..... ℔ doz. $18.50
McKinney Trucks..... each $10.00
Model Stove Trucks..... ℔ doz. $18.50

Tubs, Wash—

No. 1 2 3
Galvanized, per doz. $4.75 5.25 6.00
Galvanized Wash Tubs (8., 8. & Co.):
No. 1 2 3 10 20 30
Per doz., net.$5.70 6.30 7.20 6.60 7.20 8.10

Twine, Miscellaneous—

Flax Twine: BC. B.
No. 9, ¼ and ½-lb. Balls..22@24¢
No. 12, ¼ and ½-lb. Balls..18@20¢
No. 18, ¼ and ½-lb. Balls..16@18¢
No. 24, ¼ and ½-lb. Balls..16@18¢
No. 36, ¼ and ½-lb. Balls..15@17¢
Chalk Line, Cotton ½-lb. Balls ..... 30¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz..... 9½@11¢
Cotton Wrapping, 5 Balls to lb., according to quality..13½@20¢
American 2-Ply Hemp, ¼ and ½-lb. Balls..... 13@14½¢
American 3-Ply Hemp, 1-lb. Balls ..... 13@14½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)..... 8¢
India 3-Ply Hemp, 1-lb. Balls.. 7@8¢
India 3-Ply Hemp, 1½-lb. Balls.. 6@7¢
2, 3, ¼ and 5-Ply Jute, ½-lb. Balls ..... 9@10¢
Mason Line, Linen, ½-lb. Bls..46¢
No. 26¼ Mattress, ¼ and ½-lb. Balls ..... 37¢
Wool, 3 to 6 ply....B 4¾@6; A 5¢

Vises—

Solid Box.....60&10@60&10&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable..... 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co..... 40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50; No. 3, $10.00.
Machinist and Tool Makers' No. 4, $12.50; No. 5, $7.00; No. 6, $10.00; No. 10, $21.50.
Jewelers' No. 7..... $4.00
Fisher & Norris Double Screw..15&10%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5@70%
Lewis Tool Co..... 20@30%
Merrill's 20%
Millers Falls..... 60&10%
Massey Vise Co.:
Clincher 40%
Perfect 20%
Lightning Grip..... 20%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe..... 55@60%
Prentiss ..... 20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists' 40%
Jewelers' 33⅓%
Snediker's X. L..... 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ℔ doz. $30..... 25%
Perfection Saw Clamps, ℔ doz....$5.00
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3..... 45&50%

Wood Workers—

Massey Vise Co.:
Lightning Grip..... 15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise ..... 60&10%
Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe..... 40%
Parker's Combination Pipe:
87 Series..... 60%
187 Series..... 60&5%
No. 870..... 40%

Wads—*Price per M.*

B. E., 11 up..... 60¢
B. E., 9 and 10..... 70¢
B. E., 8..... 80¢
B. E., 7..... 80¢
P. E., 11 up..... $1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Dis. 15%
Ely's B. E., 11 and larger.$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled.....50@55&10%
Ground.....55@60&10%
Plain or Unground..60@65&10%
Country Hollow Ware, per 100 lbs...... $2.75@3.00
White Enameled Ware:
Maslin Kettles..... 70%
Covered Wares
Tinned and Turned..... 40%
Enameled..... 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....50&20%
Agate Nickel Steel Ware, Specials.. 60&15%
Iron Clad Ware..... 70&10%
Lava, Enameled..... 40&10%
Never Break Enameled..... 50%

Tea Kettles—

Galvanized Tea Kettles:
Inch..... 6 7 8 9
Each..... 45¢ 50¢ 55¢ 65¢

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles..... 60%
Porcelained ..... 50&5&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles..... 60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles..... 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ℔ doz.
Crescent, family size, bent frame.$3.00
Red Star, family size, stationary protector $3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector..... $2.65
Cable Cross, family size, stationary protector..... $2.90
Single Zinc Surface:
Naiad, family size, open back, perforated $2.40
Saginaw Globe, protector, family size, ventilated back..... $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $5.00
Glass Surface:
Glass King, Single Surface, open back $3.00
Enamel Surface:
Enamel King, Single Surface, ventilated back..... $5.00

Washers—Leather, Axle—

Solid..... 80&10@80&10&10%
Patent..... 90@90&5%
Coil: ⅞ 1 1⅛ 1¼ Inch.
10¢ 11¢ 12¢ 13¢ per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers ...$4.95 4.05 2.75 2.55 2.35
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Wedges—

Oil Finish..... *lb. 2.15@2.30¢*

Weights—Hitching—

Covert Mfg. Co..... 40&2%
Covert's Saddlery Works..... 60&10%

Sash—

Per ton, f.o.b. factory:
Eastern District..... $25.00
Southern Territory..$19.00@20.00
Western and Central Districts ..... $20.00@21.00

Wheels, Well—

8-in., $1.50@1.55; 10-in., $1.65@1.70; 12-in., $2.25@2.35; 14-in., $3.40@3.50.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....80&5@80&7½%
10 to 18.....80@80&5%
19 to 26.....80&10@80&10&5%
27 to 36.....80&5@80&10%
Galvanized:
6 to 9.....77½@77½&5%
10 to 14.....72½@72½&5%
15 to 16.....75&7½@75&10&2½%
19 to 26.....75&5@75&10%
27 to 36.....72½&5@72&7½%
Coppered:
6 to 9.....77½@77½&5%
10 to 14.....77½@77½&7½%
15 to 18.....75&10@75&10&2½%
19 to 26.....75&10&5@80%
27 to 36.....75@75&5%
Tinned:
6 to 14.....77½@77½&7½%
15 to 18.....75&5@75&10%
Annealed, Steel and Tinned, on Spools ..70&10&10@70&10&10&10%
Brass and Copper on Spools... 60&10@60&10&10%
Brass, list Feb. 26, '96.....30&5%
Copper, list Feb. 26, '96..... 15%
Cast Steel Wire..... 50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, 1903..90&10&10&10@..%

Wire Cloth and Netting—

Galvanized Wire Netting..... 80&15@80&17½%
Painted Screen Cloth, 100 ft., $1.
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft. 3 ¢
Nos. 4 and 5 Mesh, sq. ft...3½ ¢
No. 6 Mesh, sq. ft.....3½ ¢
No. 8 Mesh, sq. ft.....4 ¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural ....75&10@75&10&10%
Alligator or Crocodile..70&10@75%
Baxter Pattern S Wrenches... 70&5&10@10%
Drop Forged S.....45@45&5%
Acme ..... 60&10%
Alligator Pattern..... 70%
Bull Dog..... 70%
Bemis & Call's:
Adjustable S..... 40%
Adjustable S Pipe..... 40%
Bemis Pipe..... 60%
Briggs Pattern..... 40%
Combination Black..... 40&5%
Combination Bright..... 40%
Merrick Pattern..... 50%
Boardman's 33⅓%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Donohue's Engineer..... 40&10%
Eagle ..... 50&10%
Elgin Wrenches..... 40%
Elgin Monkey Wrench Pipe Jaws.33⅓%
Gem Pocket..... 30%
Hercules 70%
W. & B. Machinist:
Case lots..... 50&5%
Less than case lots..... 50%
Improved Pipe (W. & B.)..... 60%
Solid Handles, P., S. & W..50@50&5%
Stillson 65%
Vulcan Chain..... 50%

Wrought Goods—

Staples, Hooks, &c., list March 17, '92..... 90@90&10%

Yokes, Neck—

Covert Saddlery Works, Trimmed..70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' ..... list net

Zinc—

Sheet.....*per 100 lbs., $7.50@7.75*

For the Table of "Current Metal Prices" see the First Issue of Every Month.